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The Journal of
The Madras Geographical Association

Vol. XIII September, 1938 No. 3.

Proceedings of the Eighth Conference of the Madras Geographical Association Mangalore Session, May 1938

The Eighth Geographical Conference of the Madras Geographical Asssociation was held in the Kanara High School, Mangalore on the 19th, 20th and 21st May 1938, under the Presidency of Mr. C. J. Varkey, M.A., M.L.A., Parliamentary Secretary to the Hon'ble Minister of Education, Madras.

The Opening Session of the Conference commenced at 9 a.m. on Thursday the 19th May at the spacious Kanara School Hall before a large gathering of members and visitors. *Sri M. Madhava Rav* Avl., B.A., B.L., Manager of the Kanara High School, and Member, Municipal Council, Mangalore, welcomed the delegates and visitors on behalf of the Reception Committee with an Address (printed below). *Mr. C. J. Varkey* was then formally installed in the Presidential Chair, and he delivered his Address (also printed below). After the Presidential Address was over, *Mr. N. Subrahmanyam*, the Secretary of the Association made a statement regarding the aims and objects as well as the achievements and various activities of the Association.

The Second Session began at 11 a.m. on Friday the 20th May, when the following papers were read and discussed :—

(i) *Public Health of Mangalore in relation to Environment* by Dr. Y. Sivaramayya, Health Officer, Mangalore.

(ii) *Tile Industry of Mangalore* by Mr. U. Hammabbe, M.A.

(iii) *Subterranean Geography* by Mr. R. K. Golikere.

(iv) *The Physical Geography and Geology of South Kanara* by Mr. V. D. Krishnaswami.

The Concluding Session of the Conference commenced at 2 p.m. on Saturday the 21st May, when the following papers were read and discussed:—

(i) *Public Health of South Kanara* by Dr. D. K. Visvanathan, District Health Officer, South Kanara.

(ii) *Urban Geography of Mangalore and its Environs*: by Mr. A. B. M. Pereira, St. Aloysius College, Mangalore.

(iii) *Communication-lines of South Kanara*: by Mr. N. Subrahmanyam.

and (iv) *Place-names of South Kanara*: by Mr. Rao Bahadur C. M. Ramachandra Chettiyar.

The following papers were then taken as read for want of time and owing to the absence of their authors:—

(i) *Historical Geography of South Kanara*: by Mr. V. R. Ramachandra Dikshitar, University of Madras.

(ii) *Climate of South Kanara*: by Mr. K. Ramamurthy.

(iii) *Forests of South Kanara*: by Mr. Rao Sahib E. V. Padmanabha Pillai, District Forest Officer, Mangalore North.

(iv) *Oil-Seeds in South Kanara*: by Mr. A. K. Menon, Superintendent, Kerala Soap Institute, Calicut.

(v) *Fruit-Growing in South Kanara: Its Present Position and Future Possibilities*: by Mr. K. C. Naik, Superintendent, Fruit Research Farm, Kodur.

(vi) *Coffee Trade in Mangalore*: by Mr. H. G. Punja.

and (vii) *Population of South Kanara*: by Mr. K. Srinivasaraghavan.

After the Concluding Address of the President, the Conference came to a close with a vote of thanks.

On the 22nd May 1938, the day after the Conference was over, Mr. N. Subrahmanyam, the Secretary of the Association led a party of about 20 teachers on a full day excursion by bus from Mangalore, visiting Mulky, Malpe, Udipi, Karkala and Mudubidri—going by the coastal route, crossing the several backwaters and returning by the interior route. The members of the party, who were for the most part from outside the district, not only enjoyed the tour but also got a real understanding of the characteristic features of the Geography of the region visited, whose study was made with the help of the one-inch map also.

Welcome Address

The Eighth Geographical Conference, Mangalore 19th May 1938

BY

SRI M. MADHAVA RAU, B.A., B.L.,

Manager, Kanara High School, Member, Municipal Council, Mangalore

My friend and classmate Mr. M. N. Kamath asked me to speak a few words to-day on behalf of the Reception Committee, and as I thought, in his old age he had put himself to sufficient trouble in his search of a suitable person for this function, I felt unable to refuse, though I do not know in what my fitness for the selection lies. I studied Meiklejohn's Geography for the old Matriculation Examination; beyond this, and reading a few works of exploration like Sven Hedin's, I can pretend to no further study of Geography, except perhaps to a superficial study of Astronomy and Meteorology I made in connection with the study of Physiography, which I took as an alternative to Physiology in the F. A. class. There is not much use, however, in this self-introspection, as I have to attempt to justify my friend's choice of me, by speaking something on this occasion.

Geography is now regarded as the meeting ground of all sciences. To study the natural advantages of any country for raising any products we must have a knowledge of everything from Soil Chemistry, to Meteorological electric phenomena. To understand social characteristics, one must have an idea of the influence of climate on the human body. To understand the distribution of animals requires some knowledge of Zoological Evolution, and Geologic cataclysms. A good teacher of Geography must be one who studied all these sciences. Conversely, a pupil who has been taught by such a teacher will imbibe the cream of all sciences.

It is said that a boy who studies the history of his Country becomes a better Citizen. It may be said with equal, if not greater truth, that a pupil who learns geography becomes a better citizen of the world. We study the good points and weaknesses of all nations; we learn how some have fully utilized their national advantages, and how some have yet to utilize their abounding natural resources. It is to the latter type of countries that the stream of

overcrowded humanity in densely populated countries is to turn, if not impeded by immigration laws. We learn that if only the annual floods in the Amazon Basin and the Congo Basin could be controlled, (and for the modern Engineer this problem would not be impossible), if half the annual expenditure on armaments is diverted to this task—half the present population of the world could be fed by these tracts of abounding fertility. We learn how tariff walls and national jealousies stand in the way of the pooling of international resources to enable every country to produce the goods for which it is best fitted—and that if one could only promote a better understanding between nations, a greater mutual appreciation of the good points of different races, and real co-operation as between different states, the world would be a much happier place to live in—and the way would be open for an effort for abolishing poverty from every homestead.

If the study of Geography thus appeals to us from the stand-point of Science, and the stand-point of Citizenship how does it appeal from the angle from which it is now usual to approach every subject of School Study—namely the utility aspect for improving the young man's capacity for earning his bread? To the man who wants to take to the clerical line, whether in a mercantile or government office, the study of Geography would be most useful. If such a man is posted well in his geography, it will be unnecessary to spend time in studying books before deciding in what direction a letter directed to Bulawayo or Valparaiso is to be sent. We are told that many merchants consult astrologers before deciding to stock a particular commodity. If only they were better students of Geography, and if with this background they read English or American Commercial Magazines, they would find them better guides to these matters than ignorant astrologers. Commercial speculation has been defined by a great economist as a struggle of intelligence against chance; when giving this definition Bastable never thought that the stars might be regarded as having an influence on the prices of oils and grains.

In the old days the manufacturer produced to order given for narrow markets. Now manufacturers produce for the whole world in anticipation of orders, and in anticipation even of demand. The manufacturer intelligently calculates having regard to the conditions of every Country which his goods can reach, what quantity all these countries together can absorb. Either himself or his trusted agents have travelled these countries in order to make the above calculations. Without a previous knowledge of these

countries gleaned from a careful study of Geography, they will be unable independently to make the necessary inferences. Trade Agents have not only to anticipate demands, but to create demands. The ladies of Paris have to be tempted to wear particular furs or shawls that there may be a demand for them. It is said that within a few weeks of Prohibition being enforced in America, Californian grapes in attractive boxes were offered in distant corners of Mongolia at cheap prices.

Geography being thus fruitful from every point of view it behoves the Educational Department firstly, and school managements next, to encourage the study of the Subject in every manner. No study lends itself so easily to visual instruction as Geography. To visualize China or Burma one need not actually go to these countries. Take models and paintings prepared by the Chinese themselves and show them to your pupils. You not only enable them to have a better idea of these countries, but you kindle in them the fire of curiosity to know more about these Countries. This curiosity is the great motive force for the search after knowledge. A well stocked museum is a *sine qua non* to a proper teaching of Geography.

To the new education which seeks to promote a better international understanding, no subject will appeal more than Geography. It seems one of the questions which was set in a school in a European country was this: 'In how many hours can a town of given area be burnt by a given number of planes of size denoted?' For this we shall substitute under the New Education the following question—'What area of Brazil can be saved from the annual inundations, and how much capital has to be brought in for this purpose,' and 'which is the easiest route by which direct Railway communication can be established between Calcutta and Shanghai?'

I welcome one and all of you who have come from distant parts of the Presidency to shape the deliberations of this Conference, and I pray that the Conference will lead to successful results, and stimulate the study of Geography in the schools of this Presidency.

Presidential Address

C. J. VARKEY, M.A., M.L.A.,

Parliamentary Secretary to the Hon'ble Minister for Education, Madras

Ladies and Gentlemen,

Permit me at the outset to thank the organizers of this Eighth Conference of the Madras Geographical Association for the honour they have done me in inviting me to preside over it, and for having thereby given me an opportunity to associate myself with the commendable work of the Association in endeavouring to secure for Geography a place of equality with the more favoured sciences. I am fully alive to my limitations in occupying this privileged position of directing and guiding the proceedings of this Conference of experts in Geography. Indeed, as a student, Geography was my pet subject, in which, I still recollect, I used to top the list of successful students. Later, as a teacher of History, in this very town of Mangalore, for twenty-three years, I had taught generations of students that Geography determined the course of History, by showing how geographical conditions shaped the life and growth of the Greeks, the Romans, the British, as well as the nations of Europe and the peoples of India. Now, as a politician, I am happy to advocate the cause of Geography by emphasising, in the course of this address, how a sound knowledge of Geography is necessary for politicians and statesmen who are called upon to build up the economic and political fortunes of a nation on natural or geographical foundations. These are but poor claims for one like myself to occupy the Presidential Chair of this Conference of experts. What urged me to accept the invitation was my desire to be among the lovers of Geography so that I might contribute my little mite to encourage and strengthen the small band of enthusiastic teachers who have been struggling hard, and—I must say—successfully, to raise Geography to its legitimate place in the scheme of libral education.

I. CHANGING CONCEPTIONS OF GEOGRAPHY

In the evolution of Geography one could clearly perceive three distinct stages according to the conception of Geography prevalent in each period. The first is the period of *Commercial* Geography, the second is the period of *Physical* Geography, and the third is the

period of *Human* Geography. The conception of Geography in each period does not really replace the earlier conception; each succeeding period witnessed an expansion of the conception, so that to-day, with its fully developed conception, Geography may well take its proud position among the great sciences of study dealing with the action and interaction of Man and Nature.

(a) *Commercial Geography*

During the first period—the period of Commercial Geography—by Geography was meant merely a fact-lore, a string of names, of countries and continents, of mountains and rivers, of capes and bays, of towns and ports, of exports and imports. It was the stage of What-and-Where Geography, or, as one writer puts it, it was the "capes and bays" phase of Geography teaching. During this period, facts and figures were cared for, and these proved dull and uninteresting to the pupils who learned Geography; and it is these facts that account for the devaluation of Geography as a subject of study in schools and its consequent relegation to a secondary place in the school curriculum. Then Geography was the Cinderella: it was denied an independent and much less an honoured place among the subjects of study. The subject suffered also for want of qualified teachers and experts as in other subjects. This condition, it may be a consolation to note, was not peculiar to our country. Even in the West, the Muse of Geography was denied the homage she had a right to. According to the "Report on Geographical Education at Home and Abroad," published in 1885, "the two great weaknesses in the position of Geography were want of knowledge in the teachers and want of organisation in the curricula and methods," and the subject was, therefore, naturally never taken seriously either by the teachers or by the taught. Geography was then regarded merely as a species of general knowledge, comprising a large number of unrelated and uninteresting facts about the earth. If at all Geography was related to any other subject, it was to History, and under the shadow of History, Geography was tolerated as a step-brother and was given a step-motherly treatment. In one sense both these subjects shared the same fate in this period when exports and imports made up Geography and dates and events constituted History—the period of What-and-Where Geography and What-and-When History.

A few questions on Geography will help to give us an idea of the conception of Geography and the nature of Geography teaching during this first period of its history:

1. Name the principal harbours, natural and artificial, of India.
2. Enumerate the chief capes and bays of southern Asia.
3. What are the cotton producing districts of the Madras Presidency?
4. In which parts of India is wheat grown?
5. Name the principal ports of southern India and what are their chief exports and imports?
6. Mention a dozen of the more important towns of India, and mark them on an outline map.

These questions give us the true nature of the conception of Geography during the early days. We may well characterize this first period as the information or the memorizing stage in the genesis of the subject—or the period of Commercial Geography.

(b) *Physical Geography*

The next period is that of Physical Geography, when the conception of Geography as a mere *graphe* developed into that of a *logos*, when emphasis came to be rightly laid on the causal relationships between geographical facts and phenomena leading to their interpretation, and on the induction of general principles from particular geographical facts. This new stage in the history of Geography we may date from about the middle of the nineteenth century when two eminent German Geographers—Humboldt and Ritter—the one a humanist and the other a physicist, each from his special line of approach, systematised the geographical lore of the age. In the consequent new conception of Geography, due emphasis was laid upon physical factors and forces influencing and determining the facts and phenomena of Nature recorded in the older Geography. Commercial and economic factors, and not facts alone, came in for increased attention and investigation. Besides memory and imagination required for the study of the old Geography, an appeal was made to reason by teaching casual relations. These were the beginnings of a scientific outlook on Geography and of a proper orientation of study and research in the much-neglected field.

This change, or rather expansion, of the conception of Geography had its effect on the teaching of Geography. Henceforth the aim of its teaching is not only to know facts and phenomena, but to enable the student to understand the application of fundamental principles. Hitherto, Geography-teaching extended only to

a mere knowledge of things and not to the examination of their causes and influences. Henceforth, in dealing with the Suez Canal or the Panama Canal, for example, Geography teaching would not be complete unless the development of trade after the opening of the Canal had been fully taught to the pupils; in dealing with the monsoons, Geography-teaching would be incomplete without a study of the causes of the monsoons and their influence on navigation, cultivation of the land and distribution of population. A few questions will further emphasize the contrast between this and the earlier conceptions of Geography:

1. Describe the geographical conditions, physical and economic, that are necessary for the production, on a large scale, of rice or maize.
2. Explain the relationship between the forests and the heavy rainfall on the West Coast of India.
3. How do you account for the fact that Mangalore is famous for its tiles?
4. How will you explain that, while the district of Coimbatore is favourable for the growth of cotton, the district of South Kanara is unfavourable for it?
5. What do you think are the reasons that made the extension of the railway along the West Coast more difficult and slow than along the East Coast of the Madras Presidency?
6. Explain the causes of the difference in climatic conditions between Mangalore and Bangalore, though both are situated more or less in the same latitude.

These questions illustrate the great change in the conception of Geography from What-and-Where Geography to How-and-Why Geography, from Commercial Geography to Physical Geography.

(c) *Human Geography*

The third stage in the evolution of the conception of modern geography is what we may call Human Geography. This Geography is not satisfied with a mere knowledge of facts and features of a country, nor even with the explanation of causal relationships between facts, but deals with the influence of these facts and phenomena of Nature on the growth of population and destinies of peoples and nations. This is the most complete and scientific conception of Geography, which had raised Geography to the status of one of the premier sciences. This is called the New Geography.

It is the creation of the last half a century, and may, therefore, be regarded as a new creation, as a new science struggling for its legitimate place among the sciences. By virtue both of its aims and of its methods, Geography has become a distinct science. The principle of spatial distribution, the principle of co-ordination, the principle of causality, with the building of conclusions upon concrete facts, underlie the studies of this new science. In this conception the Earth is studied, not as a physical universe, but as the *abode of Man.* The human factor is thus being more and more prominently brought out by the new school of thought, and this new conception determines the nature and scope of the matter to be taught and the point of view from which Geographical data are to be treated. Let me illustrate this new conception of Geography by a few questions:

1. What has Great Britain done for India? What has India done for Great Britain?
2. Since India had been under British rule, which has gained more, India or England? Give arguments for both sides.
3. Why was Germany one of the greatest world powers before the World War?
4. India is the second most populous country in the world its territory is large and rich. Why is it not independent?
5. How are women generally treated in India? What is the caste system, and what does it mean in the everyday life of the people?
6. Would famines be so serious in India, if there were more people engaged in manufactures?

These questions are sufficient to indicate the new view of Geography which makes it so important a science as to be helpful to politicians and statesmen who have knotty and longstanding problems to solve. The dependence of national growth on natural circumstances and phenomena and the fact of world interdependence and the consequent actuality of modern economic co-operation are the bases of the new Geography teaching. The new Geography is, therefore, called the science of Human Environment —a practical science which ought to occupy more attention than is allowed, in any scheme of liberal education that is calculated to give to the country well-informed and well-balanced politicians and statesmen.

II. IMPORTANCE OF ENVIRONMENT

Considered in the light of this new conception of Geography as the science dealing with man's environment, the question of environment becomes at once one of very great importance in Geographical education. The influence of geographical conditions on human activities and mental and physical traits, has been a subject of speculation throughout the ages, from the Greek philosophers onwards. Time will not permit me to trace the history of this speculation. I shall rest satisfied with pointing out the two schools of thought among sociologists on this subject, which may be termed Determinism and Possibilism.

According to the school of Geographical Determinism, man, like plants and animals, is a product of his environment; and his activities, development and aspirations are ruthlessly conditioned by it. Regarding man as eminently passive, this school sets out to establish the laws of the physical environment which determine human activities, distributions, and organization, in both space and time. They overestimated the influence of one factor—the environment—ignoring the complexities of the problem of human progress and the importance of psychological factors.

The dogmatism of this school of Determinism is opposed by the school of sociologists, whose concept of human geography is labelled Possibilism. According to this school, man is an active agent; all human facts cannot be explained through environmental control only; response to environment is conditioned largely by aptitude, stage of development and social heritage. This modern concept of human geography shifts the centre of gravity from Nature to Man, the active agent. His Mode of life is the product, not of the dictates of environment, but of a complex of factors, social, historical and psychological. The environment contains a number of possibilities, and their utilization is dependent entirely on human selection. As Brunhes, one of the brilliant exponents of Possibilism, says in his "Human Geography," "The outstanding psychological fact is the antithesis of a rigid fatalistic determination of human acts by climate and soil. It is this—that natural surroundings, whether as a whole or in detail, react on us just so far, and just in such a way, as we adopt them. The man is there, the flint is there, but it is the man who makes the spark fly, for, all the essential facts begin and end in facts of psychology."

Between these two schools of thought, a layman finds himself at sea. What I feel is that the school of Determinism over-empha-

sizes the part Nature plays in shaping the destinies of humanity, while the school of Possibilism does not pay adequate regard to Nature and the part she plays in the world. Man and Nature are both creations of an all-merciful Creator. Man is, indeed, created far superior to Nature, destined to master and subordinate Nature to his own purposes. But at the same time, it should be borne in mind that the visible Nature is the light, which an invisible God, has provided in order to guide the path of Man from progress to progress. The interdependence of Man and Nature is a fact of life which no sociologist can overlook without missing the true perspective of life. The world moves on the foundations of this alliance between Man and Nature.

Though man—thanks to the wonderful progress modern science has made—is not to-day a mere slave of Nature, we must admit that man's growth is to some extent circumscribed by his environment in its twofold aspect—the *human* environment into which man is born and with which he is most intimately associated, and the *natural* environment out of which man derives the materials of his sustenance. The natural environment of humanity consists of three groups of factors, which may be called permanent factors, changing factors, and vital factors. By permanent factors are meant those related to the material composition of the earth, which we study under the two familiar names of Geology or the substance of the earth and Geography or the regional distribution of land and water on the surface of the earth. Associated with this first group of permanent factors is the second group of changing factors which are the meteorological factors which relate to climate and weather, climate being the more or less constant quality and weather being the condition which may vary from day to day and sometimes from hour to hour. These climatic factors are the active factors in the natural environment of humanity. By the interaction of the permanent and changing factors we have the third group which may be called the vital factors of life. It is in these vital factors that humanity exhibits its powers, and that, therefore, Geography reaches its highest point of usefulness, enabling us to observe the differences that arise because of geographical circumstances. In the study of Geography all these aspects or factors—permanent, changing and vital—must be paid attention to.

One effect of the connection between this threefold natural environment and the growth of nations is the conception of Historical Geography, that is, the study of the effects of the surface relief

upon political and racial boundaries and upon national life and growth. Although no scientific method of working out in detail the positive effects of geographical environment on History is yet available, the fact of the influence of Geography on History cannot be denied, and that is why books on History invariably begin with references to the influence of the geography of a country on its history. Indeed, we cannot say with the mathematical precision of an exact science the degree of influence, say, of climate on the intellectual advancement of a nation or of the coast-line on the colonial expansion of a people. However, it must be recognised that much of the development of humanity depends upon natural conditions. If Austria did not possess a colonial empire as wide and glorious as the British, if India has not developed into as great an industrial country as Germany or America, the explanation must be sought in Geography. With me it was a favourite point in teaching History, to show this connection between the natural and human factors by formulae like $M+N=H$, $2M+1N=H$, $1M+2N=H$, according as the natural or the human factor predominated in the shaping of the History of a nation. Unless we take into careful consideration geographical or natural circumstances along with the historical and psychological factors, in shaping the life and growth of nations, we are sure to miss the true perspective, and consequently blame a nation for what it could not do, instead of blaming Nature for not helping the nation to do it. If Mangalore, and not Bangalore, became famous for the tile industry and for trade in Coffee, it is not due to any special genius in the people of Mangalore, but due to geographical facilities which Mangalore was blessed with by Nature and which Nature had denied to Bangalore. If Mangalore does not have cotton mills like Coimbatore or Ahmedabad, it is not because the people of Mangalore lacked any genius inherent in the people of Coimbatore and Ahmedabad. Thus the economic activities of a place or of a country depend very much on natural environment. From this new conception of geography and of the influence of natural environment on humanity, it is evident how important geographical education is to get at a true perspective in life—to get at truth, which is the aim of scientific studies.

III. THE PLACE OF GEOGRAPHY IN THE MADRAS EDUCATIONAL SYSTEM

From the foregoing exposition of the conception of the New Geography and of the interdependence of natural environment and growth of nations, it is obvious that geography is a science of the

utmost importance as a subject of study. The question then arises what place have we assigned to Geography in the scheme of education in our Province, and this question leads us to make a brief survey of the history of Geography in our educational system. This history I find it convenient to divide into three main periods by bringing into relief two landmarks in this history, viz., the the year 1910 when a great revolution took place in our secondary education by the supplanting of the old Matriculation by the present Secondary School Leaving Certificate, and the year 1926 when a propaganda in favour of Geography was started with the inauguration of the Madras Geographical Association. These two landmarks divide the history of Geography into three periods—(1) up to 1910, the period of mere tolerance of Geography; (2) from 1910-1926, the period of depression for Geography; and (3) from 1926 onwards, the period of increased recognition for Geography.

During the first period, i.e., up to 1910, no doubt we had Geography as a compulsory subject of study for the old Matriculation; but it was the What-and-Where Geography, which, as already pointed out, made boys simply cram place-names, length of rivers and height of mountains, and lists of exports and imports, and made Geography, therefore, one of the repulsive subjects of study in the High School Classes. Indeed, there was also the How-and-Why Geography in the old F.A. Course, but it was not a compulsory subject for all, it was only an alternative to compulsory Physiology, and the subject was known as Physiography and not Geography. This first period may, therefore, be characterised as the period of mere tolerance of Geography, with no enthusiasm for the subject either in the teachers or in the pupils.

With the supplanting of the old Matriculation by the S.S.L.C. and of the old F.A. by the new Intermediate course, in 1910, we enter the second period in the history of Geography, when this subject was thrust down to a secondary place. Under the S.S.L.C. scheme Geography was relegated to the B. Group, and this change meant a sudden setback to the teaching of Geography and a gradual falling off of interest in the subject. The process of depression did not stop there; for, in 1917, Geography and History of India were removed from the B. Group to make room for the History of the British Empire. This was tantamount to the sounding of the death-knell of Geography in our High Schools. While it was thus kept depressed in the School course, it was entirely suppressed in the College classes, for in the new Intermediate

which took the place of the old F.A., Physiography was completely dropped out and no vestige of Geography was left in the collegiate course of studies. This was, therefore, the period of depression, nay, of humiliation, to the Muse of Geography. Towards the end of this period, however, a ray of hope dawned on Geography in an unexpected manner. In 1920, the late Dr. Gilbert Slater, the then Professor of Indian Economics, noticing the ignorance of Indian Geography in graduates who joined his course for the Diploma in Economics, moved a resolution in the Senate, urging that something should be done to give Geography an adequate importance in the scheme of University Education. As a result of this move, the Grieve-Slater Committee was appointed to examine the question, and as its first fruits, in 1923 Geography was given a special importance by separating it from History in the L.T. Course, and later in the revised Intermediate course, Geography was introduced as one of the optionals in A Group, by the side of respectable and respected sciences like Mathematics, Physics, Chemistry and Natural Science.

During the period after 1926, under a favourable constellation, Geography began to make a steady progress in the School, in the College and in the University. In the revised S.S.L.C. scheme Geography was restored and given a tolerably honourable place. In the school it is no more the Cinderella it once was. With teachers specially trained in Geography, with more rational and revised syllabuses, with more and suitable charts and maps, with occasional Geographical excursions and exhibitions, it is gratifying to note that due homage is now being paid to the Muse of Geography in our schools. In the College, in the B.A. Course, Geography now stands in all its glory as one of the independent and equal subjects of study along with other Arts and Sciences. Unfortunately no College has yet taken up the course leading to the Degree in Geography which a sympathetic University has instituted. Perhaps the attention of the Government has not been drawn to the fact that, as Geography is an equally important nation-building subject as Economics, and as the Presidency College is expected to give a lead in introducing and working new courses of studies, the B.A. Course in Geography ought to be provided in the Presidency College. However, here let me make an appeal to some college or other in the Province to open the Geography course. Perhaps, as a result and as a souvenir of this Geographical Conference in Mangalore, may I not turn to the authorities of St. Aloysius' College to open this group and thus

enjoy a monopoly of Geographical education in the B.A. Course in the whole Presidency. Again, in the University itself, Geography is given an honourable place by the side of Economics, Indian Music, Librarianship, French and German, with its own University Diploma Course. A new Geography Department of Teaching and Research, with a full-time Reader in Geography, has been instituted by the University by the side of the older Departments of Economics, Indian History and Archaeology, Mathematics and Philosophy and some of the sciences. And there is now a separate Board of Studies in Geography to give expert advise to the University on matters pertaining to Geography. Both the Department of Education and the University of Madras have thus at last come to recognise the importance of Geography as a subject of study.

Here I may be permitted to make an observation and an appeal regarding the plight of Geography in the L.T. Colleges. To my great surprise I came to know that what is being done in the L.T. Course is to give training in the teaching of Geography to graduates who have no knowledge of Geography—constructing a building without the foundations! May I not suggest that only those graduates who have taken the University Diploma in Geography should be admitted to the Geography section in the L.T. Course. This suggestion, if adopted, would help both the University Diploma Course, which would in that case increase in popularity, and the L.T. graduates who will not only have a training to teach Geography, but also a strong foundation in the knowledge of the subject. I commend this suggestion both to the University and the Department of Education for their early and sympathetic consideration.

If Geography has in this way been raised to its legitimate position which it never had in our educational system in the past, the entire credit—I am sure you will agree with me when I say—goes to the Madras Geographical Association, and especially to the enthusiastic band of lovers of Geography who started and worked the Association. Among these, I will single out—with your indulgence—Mr. N. Subrahmanyam, M.A., L.T., F.R.G.S., who is, and has been all along, its able and zealous Secretary and to whom both the Association and the Conference owe their life-blood. What Rao Bahadur K. V. Krishnaswamy Iyer is to the Tamil Lexicon Movement, what Rao Sahib S. R. Ranganathan is to the Library Movement, what Prof. S. K. Yegnanarayana Iyer and Prof. M. S. Sabesan are to the South Indian Teachers' Organi-

zation Movement, Prof. N. Subrahmanyam is to the Geography movement. To him the Muse of Geography owes a deeper debt of gratitude than to any other of her devotees in South India. By means of its quarterly journal, annual Conferences, periodical Refresher Courses and Summer Schools, District studies in Geography, occasional Geographical excursion, Tamil Geographical Terms Committee and by collaboration with, and representations to, the Education Authorities, the Association and its Secretary have done an immense service to the cause of Geography in Southern India.

IV. AIDS TO THE TEACHING OF GEOGRAPHY

Ladies and Gentlemen, I believe I have said enough on Geography by way of my Presidential Address. But judging from the performances of those who occupied your Presidential Chair in the past, I find I have still to touch upon two points—the geographical study of this district where you have assembled for this Conference and a few words of advice and guidance to teachers of Geography. But I am afraid I would be taxing your patience if I were to lengthen out this address any further. Yet, with your permission, I will say a word or two on these points too.

I find from the Rules of your Association that one of its objects is "to promote regional studies about South India from various points of view," and I also find from the past reports of your Secretary that the method adopted for the realisation of this object is to make a regional study of the particular district in which the S.I.T.U. Conference meets. I appreciate this practical method of realising this object of the Association. This District of South Kanara has been the scene of my activities for twenty-three years, and I may well claim to have a fair acquaintance with the Commercial Geography, the Physical Geography and the Human Geography of this district. Were I to follow the example of Rao Sahib C. M. Ramachandra Chettiar, President of the last Conference, and plunge myself at this stage into the Geography of South Kanara, I am afraid I would have to deliver another Presidential Address. I will deliver you from the infliction, particularly because some of my friends among the teachers in this District are coming forward with papers dealing with the regional geography of the District, which is full of striking geographical contrasts and interesting geographical features.

With regard to giving a few words of advice and guidance to teachers of Geography, I feel I am incompetent to discharge that

function of the President. On the last occasion the President-Elect, Prof. K. S. Vakil, pointed out, in the course of his address, some common errors in Geography-teaching. Not having had the happiness of being a teacher of Geography, it would be an act of presumption on my part, were I to follow his example. However, you will forgive me if I venture to refer to some of the practical aids to the teaching of Geography, which aids I myself had found helpful in the teaching of History.

The first place among such aids ought to be given to maps, charts and graphs; a detailed account of making and using them is given by the expert, Miss E. D. Birdseye, in the last of the six lectures in Geography, delivered under the auspieces of the Geography section of the Madras Teachers' Guild and published as a supplement to the "South Indian Teacher" (Vol. 2, No. 2) some years ago. Another practical work is an occasional lantern show and exhibition of educational films depicting geographical facts. In the city of Madras I happened to witness one day a very useful educational film illustrating wild life in Africa. Such shows produce a lasting impression on the young minds, supplementing the meagre pictures in Geography text-books. Occasionally, students could be taken out for geographical excursions to neighbouring villages and towns. Once a year a geographical exhibition, or an educational exhibition with a geography section, could be held in the school by the co-operation of the teachers and the pupils. Recently I had occasion to open an Educational Exhibition in the Board High School at Tiruvarur in the East Tanjore District. It was very instructive to see the boys exhibiting and explaining geographical phenomena in the Geography section of the Exhibition, particularly such things as the Earth and its companions, the mantle of the Earth under our feet, the atmosphere as a part of the Earth and Water on the earth. Moreover, every school could have a small Geographical Museum, or a Geography Section in a School Museum, and if the boys were encouraged to collect specimens for their museum, the study of Geography could be made very interesting and instructive. In fact, for effective teaching of Geography, as for Science and History, a good laboratory with specimens, maps, charts and graphs, is necessary. There is, again, the possibility of "dramatising" geographical phenomena. During my visit to Guntur I witnessed the "dramatisation" of the Solar system by the girls of the St. Joseph's Convent High School. The Solar system was illustrated in a most practical manner, one girl represented the sun, and others, personifying the planets, moved

round the sun along their respective orbits which were drawn in chalk on the ground, and it was very interesting to watch other girls representing satellites like the Moon, dancing round the planets. It is one of the most instructive methods of teaching Geography I had ever seen.

All these mean enthusiasm in the teacher of Geography. It is a firm conviction with me that in education it is Man that matters, and not the Method. If the teacher has real enthusiasm and some passion for his subject, he could impart a little of that enthusiasm and passion to his pupils, and make the study of the subject interesting and even fascinating. Even if a school is poor, and cannot, therefore, possess an adequate supply of maps, charts and graphs, the pupils could make them with the help and guidance of an enthusiastic teacher; he could improvise ways and means of doing many things in the most practical manner as aids to the teaching or study of Geography.

Let me now conclude assuring the teachers that the future of Geography depends upon the teachers of Geography. By their enthusiasm and efforts they must help the Association in its praiseworthy attempts to raise Geography to a high pedestal among the subjects of study. Let me close this rather lengthy address, congratulating the Madras Geographical Association on the splendid work it has done in the cause of Geography. Thanks to the efforts of the Association, Geography has been elevated from among the "Depressed Classes" of our educational subjects. With sustained efforts and perseverance on the part of the Association and with increased enthusiasm in the teachers of Geography, I am sure the Muse of Geography is bound to occupy a still higher position in the Olympus of educational subjects and to secure for her a deeper homage and a wider popularity among the rising student population of our beloved Motherland.

Historical Geography of South Kanara

By

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South Kanara has an area of 3902 square miles, and consists of five taluks—Mangalore, Coondapoor, Udipi, Kāsargod and Uppinangadi. Attached to it is a group of small islands known as Amindīvis. There are only two towns in the whole district, and these are Mangalore and Udipi. The urban population is 4.56 per cent. Thus as many as 95 per cent of the people live in villages. Taking the population of the district as a whole, 81.68 per cent. are Hindus, 10.6 are Mussalmans, 6.75 are Christians and about 1 per cent. Jains. The Hindus of the district are mainly Śaivas. Only 11 per cent. of the Hindus are Vaishnavas and 4 per cent. Mādhvas. Tulu is the prevailing tongue in three taluks—Mangalore, Udipi and Uppinangadi—as Malayalam is in Kāsargod taluk and Amindīvi islands. The climate is characteristically humid and malarial. Agriculture is the main industry of the people. [1]

There are many legends regarding the origin of the Tulu country, and the most important of all seems to be the account preserved in the *Keralolpatti* which ascribes the founding of the kingdom to Paraśurāma. There are some indications which bear ample evidence to its association with the honoured name of Paraśurāma. One may be the temple of Renuka at the village Kunjaragiri, south-east of Udipi. Foreign geographers and Śangam works give details of cities and ports that flourished in the early centuries of the Christian era. Barace of Pliny (A.D. 23-79) is identified with Basarūru while Maganur of Ptolemy and Mangarouth of Kosmos Indikopleustes are regarded connoting one and the same place, standing for Mangalore. That this last place was sacred to the goddess Mangalādevi is evident from the *Śilappadikaram.* Again Oloikhora of Ptolemy is identified with Ālavakheda in the northern half of the present South Kanara district,[2] and this term is said to refer to the original territory of the Ālupas who seem to have ruled Tulunadu from at least the fifth to the eleventh century, if not later.

1. South Canara Manual, Vol. II. (1895).
2. See in this connection B. A. Saletore: *Ancient Karnataka.*

South Kanara, it will be noted, went by the name of Tulunadu in the early centuries of the Christian era, and formed a part of the ancient kingdom which was known as Karnātaka, *Karunādu* of Tamil Śangam literature. Tulunadu, it is just possible, formed the frontier state between the Tamilagam and the Karnataka country proper. It formed a portion of the western part of the Karnataka proper. The people of this territory are known in Śangam literature as Kosar and Nānmolikkosar, whom I have sought to identify with the Satyaputras of Asoka's inscriptions.[3] The kingdom of the Tulus had the Konkana country on the north, that part of Karnataka forming the present Mysore on the east, Kadalmalainadu on the south, and the Arabian sea on the west. Thus we see that the territory now known as South Canara was a separate and independent territorial unit in the first few centuries of the Christian era. The people were addicted to speaking truth, and hence the attribute Nānmoḷikkosar. Remnants of this tribe are perhaps to be found in the community of Koragar, gradually and across the ages, degraded to the status of a wild tribe.

In the Śangam age, as testified to us by the Tamil literature of the period, the Konganar who were the people of Kongu nadu, the northern neighbours of the Tulus, were hostile to the latter. If the evidence of *Ahanānūru* (15) and the *Narrinai* (391) could be pressed into service, there is every reason to think that the Tulus were an independent people in the age of Śenguttuvan, roughly second century A.D., and were brought under the Chera rule by Śenguttuvan. Whether the Kosar sought a voluntary alliance with the powerful Chera sovereign as against the ruling chieftain of Konkan, and the equally hostile Cholas, it is difficult to say with any definiteness. It seems that the Tulu Kosar, as I have elsewhere said, cultivated peaceful relations with the Chera king. It is equally difficult to identify their capital city. The Śangam literature refers to Sellūr to the east of which lay Niyamam, as the capital of Kosar. There is a difference of opinion whether it was to be located in the east coast or the west. For we find that even in Śangam days the Kosar had begun to spread in different directions and settle in several parts of the Tamil districts.

Mention has already been made that the Āḷupas ruled this land for about six centuries from the fifth century at a rough estimate. The terms Ālupa, Aluka and Alva seem to be variants all of which trace their origin perhaps to the serpent king Sesha. If

3. See The Kosar, their place in South Indian History, (*Indian Culture*, Vol. I).

this were granted, the Ālupas then belong to the Nāga stock, and we know from history and legend that the Nāga tribes were once powerful on the west coast. Apparently the ancient ruling chieftains who were the Kosar were overcome by the mighty branch of the Nāgas who were the Ālupas and who extended their sway. The Kosar were so much beaten that they retreated to the Tamil districts proper and settled in peace.

It is not necessary for our present purpose to review the inter-state relations between the Ālupas and the neighbouring ruling kings of South India at that time. There is inscriptional evidence to show that the early Western Chalukyas had annexed this Ālupa kingdom.[4] An important king of this dynasty seems to be Chitravāhana who was a contemporary of Vijayāditya Satyāsraya (A.D. 680-696). Udayāvara was his capital. He seems to have been an ally of the Kadambas. The next king of some importance was Bankideva Ālupendradeva who may be assigned to the middle of the eleventh century A.D. Two records relating to this ruler come from Bārakūru mentioned as a prominent port town in this century, though foreign geographers are silent about this port. This explains that it must have risen to prominence only in the eleventh century A.D. when it became a provincial capital of the Tulu kingdom. Under him the kingdom expanded and included Śāntalige Thousand. But Tuluva once again became a feudatory of the Western Chalukya king Vikramāditya VI who reigned c. 1073-1127. It seems to have recovered its independence about 1138 A.D. and lost it again about 1190 when a General of Someśvara Deva attacked it.

Early in the eleventh century, however, we hear of the Chola invasion and occupation of Tuluva. Panchava Mahārāya, a general of Rājarāja Chola invaded and occupied among others the Tulu kingdom. Traces of the occupation are seen to this day. One is the temple of Cholisvara at Bhattakala. Another is a settlement in Tulu of the Vellala communities who enjoyed *mirāsi* and other rights connected with agriculture. These communities improved to a large extent the cultivation of agricultural crops. The relations of Tulus in the twelfth century with Kadambas, Kālacūryas, Kākatiyas and others may be passed over as they have no direct bearing on the subject. Under the Hoysalas, however, Tulu was in a flourishing condition. The Hoysala rulers endeavoured to promote the moral and material welfare of the people. Next the kingdom passed

4. *Ep. Ind.*, vi. p. 10 Ins. dated 634-5.

under the Vijayanagar empire and was ruled by Viceroys who had their capital at Bārakūru. We have an important record of a grant during the tenure of the Viceroy Nāgarasa Oḍeya in Bārakūru dated A.D. 1399. When the grant was made it is said that besides the Viceroy who is entitled mahāpradhāna, the sixteen seṭṭis of the ten streets of the city, 770 citizens, sixty Ballalas, representatives of Mūḍila Niḍambūru, Nādavas, Nayaks of four grāmas, and of four nādus were present. This means that representatives of the city and country parts were present on the occasion. Apparently these correspond to the *paura-jānapada* of Sanskrit literature. This shows how representative institutions continued to flourish in India as late as the fourteenth century A.D. Notwithstanding a prosperous state of affairs under the rule of Vijayanagar, the coast ports and towns became the target of attack by the Portuguese.[5] The first landmark in the history of the Portuguese in this district was the landing of Vasco da Gama in 1498 on one of the islands of the coast of Udipi which island he named 'El Padrou de Sancta Maria', or St. Mary Isles by which name these islands are still known. The coast of South Canara was still open to the Arab and Moplah trade. But in 1524 Da Gama came to know of the Muhammadan merchants of Calicut having trade relations with Mangalore and Basrūr. Rivers were blockaded by the Portuguese who were out for commercial supremacy. Mangalore was conquered in 1526 and Christianity was preached by Franciscan friars. By the year 1526 the Portuguese became so dominant that they levied a sort of tribute of grain from all the chiefs of the west coast. This was all possible because of the support the Portuguese were able to secure from the Vijayanagar rulers, some of whom regarded their assistance very valuable. But with the fall of Vijayanagar and the success of Muhammadan arms in 1565, some of these chiefs invoked the aid of these Muhammadans against the Portuguese. This was resented by the Lingayat Ikkeri, sometime ruler of Tuluva, as a feudatory of Vijayanagar, and early in the 17th century he attacked these chiefs most of whom were Jains and gave a death blow to all Jain influence in the district.

Though there was a slight misunderstanding between the Ikkeri chief and the Portuguese, still by a treaty of 1631 they once more became friends and the Portuguese were allowed to erect a fort at Basrūr. It was in 1646 the capital was removed to

5. I have generally followed here South Canara Manual, Vol. I.

Bednore. Such friendly relations continued to the end of the 17th century. By 1718 the Dutch had a factory at Basrūr. In the meantime the material prosperity of the district was arrested by a number of imposts and extortions by the officials of Bednore chiefs. The story may be soon told. The hardships of the people became greater by the conquest of Mysore by Hyder Ali and his son Tipu. This resulted in the capture of Bednore by the English in 1793 whose governor was an ally of Hyder Ali. It was in 1799 South Canara was annexed by the British and Captain Munro (afterwards Sir Thomas) was appointed Collector in June 1799. And from February 1st 1800 its administration was taken up by the Madras Board of Revenue. Peaceful measures were adopted and a calm prevailed after a storm extending over nearly a century.

In concluding, it would be interesting to furnish a bare outline of the history of the kingdom, people, religion, agriculture and trade of the district through the ages. If we are to believe the Tulu version of the *Grāmapaddhati,* which may roughly be a composition of the latter half of the 13th or 14th century A.D., the whole of ancient Tulu kingdom was divided into thirty-two gramas whose representatives had a voice in the administration of their grāmas. Ibn Battuta who visited Canara in 1342 saw no wheeled carriage. Merchants carried on trade with the help of a number of carriers. But during the last fifty years and more the internal trade of the district has considerably increased by a popular use of carts for which roads are suitable.

The chief profession was agriculture supplemented by cottage industries. Cultivation of coconuts, areca nuts and sugarcane has also been in existence for a long time. The ancient people of this district built ships and traded with neighbouring parts. In fact ship building appears to have been a very ancient industry of the west coast in general, and South Canara contributed its own share to the promotion of this art. Salt fish must have been an article of trade. Industrially this district has remained backward through the ages due to lack of raw materials necessary for industries, and due again to heavy rainfall during the major portion of the year. There has been for a long time a constant flow of internal trade with facilities afforded by some principal rivers up and down from the coastal ports. But this system was never considered satisfactory.

A word may be said about the peoples of the district and their religion. Tradition has it that the Kadamba king Mayura Varman

of the 8th century A.D. invited Brahmans from Ahikshetra, differently identified with that on the Godavari and also with Haiga near Gokarnam, and in the thirty-two villages above mentioned these Brahmins settled. These Tulu Brahmans are known as Shivalli Brahmans and are largely followers of Madhvācarya. There are as many as a dozen sub-divisions of the Brahman community. The next influential class is the caste of Bants who were originally a military class and now reduced to a landowning and cultivating community. In point of numerical strength is the community of the Billavas or toddy drawers. There are besides a number cf occupational classes. The ancient religion of the people consisted in worshipping serpents and bhūtas,. Soon Śaivism began to take firm hold while Vaishnavism, Buddhism and Jainism were introduced long after.

Physiographical and Geological Survey of South Kanara District

By

V. D. Krishnaswamy, M.A., Dip. Arch. (Cantab.)

The district of South Kanara is situated on the western coast of Peninsular India halfway between Cape Comorin and Bombay and bounded on the north by North Kanara (Bombay Presidency), on the south by Malabar, on the east by Mysore and Coorg and on the west by the Arabian sea.

The northernmost limit touches latitude 13·58′·30″ N, while the southernmost 12·4′·15″ N. The eastern and western limits are 75·44′·31″ and 74·43′·26″ respectively.

Politically South Kanara is divided into 6 taluks, Coondapoor, Udipi, Mangalore, and Kasargod forming the coastal taluks, while Karkala and Uppinangadi form the hinterland nearer the Ghats. Mangalore is the most central of the coastal taluks. To this must be added the northernmost islands of the Laccadive group known as the Amindivis. This division does not reveal any unity of character but geomorphologically the district has a distinct personality in that it merges with the entire west coast in its physiographical and geological characters. In every taluk there is a repetition of the features of the entire district.

In shape the country is narrowest in the north in Coondapoor taluk and broadest towards the south along the parallel through Mangalore, and narrower again in Kasargod. Roughly it is 150 miles long along the Arabian seaboard and 25 miles in its narrowest and 50 miles in its widest part. Thus it is of a very elongated scalene triangle.

The general aspect of the country as a whole is a flatness uniformly bounded on the east by the abrupt rise of the Western Ghats of Mysore and Coorg and limited towards the west by the sea and yet infinitely diversified. Much of the level surface is bare and treeless and strewn with denuded granite boulders. There are numerous spurs near the coast; and bold isolated crags rise abruptly from the plain, thus preventing monotony.

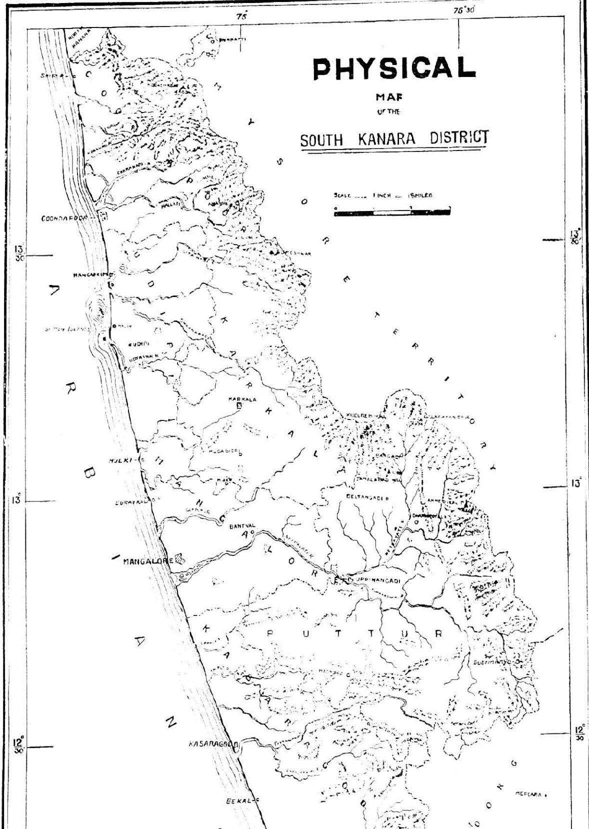
MORPHOLOGY

The watershed or the scarp of the Western Ghats forms a natural frontier on the east. The peaks of the Ghats vary from 3,000′ to 6,000′ in height. The average height of the range may be taken at 2,000′ towards the north and 3,000′ further south. In the northern part the range on its western side assumes as a rule precipitous cliffs as far as the Bangady valley to the east of Kudremukh, the highest peak of the range; but to the south of this where the range is further from the sea, it has more of the character of parallel ridges intersected by deep valleys from which the important rivers of South Kanara take their rise.

Coming from the north in the Coondapoor taluk where it is very near the sea with spurs coming down in all directions, the main line of this range soon swerves suddenly to eastward round in the Kollur valley. South of the valley rises the prominent peak of Kodachadri (Sugar Loaf peak) 4411.′ Then the Ghats take a S. E. direction with an average elevation of 2,000′ to the Kudremukh (Mount Hyder) 6,215′ the highest peak in the district abruptly terminating on the south when viewed from the west. From this point it takes a southerly trend and sweeps round the Uppinangadi taluk to join later on the broken ridges of the Coorg and Malabar on the southern boundary of the district. At the extreme south in Kasargod taluk the range again approaches the sea in a broken irregular manner and long spurs from the Ghats run downwards in all directions.

Interesting mountains of South Kanara :

KODACHADRI	—	17 miles from Coondapoor	4400′
KUDREMUKH	—	Highest scarp of the ridge of the Western Ghats facing Beltangadi, it is a group of three peaks, Kudremukh with a magnificent precipice over 1,000′ but two other peaks are slightly higher. MIDGE POINT 6,177′ & FUNK HILL 6,207′.	6173′
BALARAYANDURG	—	over Bangadi valley	4934′
KATE GUDDA	—	south of Charmadi Rd.	4534′
SISALKAL	—	over the Tisla Rd.	3921′
SUBRAMANYA	—		5667′


PHYSICAL
MAP
OF THE
SOUTH KANARA DISTRICT
COONDAPOOR
MANGALORE
KARKALA
BANTVAL
UPPINANGADI
BELTANGADI
KASARAGOD
BEKAL
MULKI
UDIPI
MERCARA
P U T T U R
MYSORE TERRITORY
COORG
MALABAR
ARABIAN SEA
AMINDIVI ISLANDS
Chetlat Dwi
Kiltan Dwi
75°
75°30'
13°30'
13°
12°30'
12°

17 miles N.E. of Mangalore and within 10 miles of the Ghats is the rugged double peaked hill of limestone rising almost vertically from the low country which the mariners call the Ass's Ears or Kudanjacull (Mudibidri) 1,000′. Among the isolated hills, Ammadakkal rises from the low country a little distance off the Ghats in the Uppinangadi taluk to a height of 4261′ and the rock of Jamalabad to 1788′

The mountain range is only the escarpment of the Mysore plateau and in its present north-south strike in our district it shows no axis of tectonic upheaval coincident with the strike. What is at present seen of it is but the deeply eroded remnants of the original plateau. Hence the hills of our area are typical of the heights which have been moulded by epigene forces of weathering and may be truly styled as mountains of circumdenudation i.e., they are the outstanding remnants or outlines of the old plateau of the peninsula that have escaped the denudation of ages. Mountains of this type are termed 'subsequent' or relict type. The hills of the district as well as the mountains of the whole peninsula are therefore examples of the relict type.

West of the Ghats is the broken laterite plateau of the average height of 200′ (varying from 150′ to 400′) with a general slope towards the sea. This level surface is strewn with denuded granite boulders; and nearer the coast bold isolated hillocks rise abruptly from the plain which prevents the monotony. The whole tract is exposed to the severe S. W. monsoon. The annual rainfall 145′ is concentrated between June and September. As the main agent of erosion is thus water, fluviatile forms are much in dominance. The high-level laterite plain—of which the Mudibidri Plain is—a good example—is cut up into innumerable valleys, the tributary branches all converging into the main channels of erosion.

The next prominent feature is the low fertile alluvial coastal plain west of the laterite Plateau and held mostly under rice and cocoanut palm cultivation. The coastline is indented at the mouths of all rivers with lagoons and creeks.

Thus physiographically South Kanara falls into 3 distinct parallel zones viz.,

1. The gneissic mountains on the extreme East constituting the Ghats or the Sahyadri range,
2. The laterite plateau in the intermediate zone cut up by the river valleys into undulating plains, and

3. The narrow strip of coastal tract of sandy alluvium and the backwaters.

Even the landscape is controlled by the geological features pertaining to the three zones mentioned above. Though S. Kanara is essentially a forest district, the heavy forest only begins from 20 to 30 miles from the coast; but to the south of Mangalore and north of Kasargod it recedes farther inland, the plain being more extensive. Cultivation is mainly confined to plains close to the coast and the bottoms of valleys which wind amongst laterite downs and plateaux from the Ghats to the sea. The only bare spots are formed by the hard laterite plateau between 1 and 3.

THE DRAINAGE PATTERN

The rivers though numerous in the district are of no great length. They are all of the consequent type and flowing from east to west. Not one of them takes its rise beyond 20 miles of the Ghats which are nowhere beyond 50 miles of the sea, so that, the course of the longest river is considerably less than 100 miles.

As the entire coast is under the terrific S. W. monsoonic influence, the rivers are raging torrents in that season and this factor alone is quite sufficient to account for the dendritic pattern of the river basins—a feature that must have developed entirely under fluviatile erosion.

The 6 principal rivers of South Kanara besides a number of small ones are:—

1. The *Gangoli* or Gurget is the name of the most important of several streams of no great size that meet and form a broad estuary to the north of the town of Coondapoor and fall into the sea at Gangoli. This estuary is the most picturesque and an extensive salt-water lake with only one outlet into the see. In the lagoon are a number of fertile islands or lankas. The other streams that form this estuary are Kollur and Chakranadi.

Haladi takes its rise in the Ghats near Amashbail 6 miles north of the Udipi taluk. It is influenced by the tide nearly as far as Haladi about 17 miles from the mouth and is navigable up to that place even in the driest season.

Kollur has its source in the Ghats; and after a short course keeps skirting the coast for about 10 miles north of Coondapoor and is navigable to a distance of 12 miles from its mouth.

Chakranadi joins the Kollur 3 miles from Coondapoor and is navigable about 12 miles from its mouth.

2 and 3. The *Sitanadi* takes its rise in the Ghats beyond Someshwar to the N. E. of the Udipi taluk, while the *Swarnanadi* flows from the hills situated at the eastern boundary of the same taluk. Both join to form the backwater at Hangarkatta nearly 8 miles to the north of the Udipi town.

The Udayavar river falls into the sea at Malpe after skirting the coast for several miles.

4. and 5. The *Netravati* rises in the Ghats east of Kudremukh, flows down the Bangadi valley past Beltangadi, after which, joined by other affluents from the Ghats, it meets at Uppinangadi another large river called the Kumardhari which comes from Kumarparvat near Subramanya. The combined stream—Netravati—passes over a very rocky bed with many rapids to Bantval and westwards through very richly wooded banks to Mangalore. As it approaches Mangalore the channel widens itself and is studded with a number of islands called Kadres rising a few feet above the surface of water. These are exceedingly fertile.

At Mangalore (Kodial Bunder) the Netravati effects a junction with the *Gurpur* river and both discharge their combined waters into a backwater or lagoon—forming a common estuary to the two rivers and having a long spit of sand 3½ miles long and 300′ wide at its narrowest point with 6 to 7 feet of water over it at the low spring tides. Though it has two openings to the sea one at the northern and the other at the southern end, it is connected now with the sea at the mouth of the Netravati river. Netravati is navigable up to Uppinangadi, a distance of 38 miles in the hot season. From Uppinangadi it is further navigable in the rainy season another 12 miles up to Dharmastala.

6. The *Chandragiri* or Payaswani is the most important of the six rivers of Kasargod taluk; and the town of Kasargod is built on the mouth of this river. It has two branches one rising in the Uppinangadi hills and the other in the Ghats on the Coorg frontier. This river is navigable for about 10 miles from its mouth.

All these rivers are tidal and therefore afford easy communication for some distance inland from their mouths for small boats.

The power of corrasion and transportation being directly proportional to the square and sixth power of the velocity of the river, the swollen rivers in the monsoon time do a lot of work. Channels are cut vertically downwards and a lot of alluvium is brought down to the coastal region from the hills which makes it extremely fer-

tile for rice and cocoanut cultivation. The floods are not at all destructive as the waters are confined principally to the deeply cut channels. The curve of erosion of most of these rivers is not a smooth one as when it is at grade, but of a very irregular character with rapids in their higher courses. So it has been remarked that whereas the rivers east of the Ghats flowing into the Bay of Bengal are of mature age with their curves of erosion practically at grade, the west coast rivers are in their youthful stage with rapids and waterfalls as typical features.

The water-table oscillates up to 40′ between monsoon and non-monsoon seasons.

COASTAL TOPOGRAPHY AND EPICONTINENTAL FEATURES

The coastal topography is equally interesting. The coast-line of South Kanara actually begins from a few miles south of Bhatkal in N. Kanara. The entire coast-line is indented by numerous creeks and bays formed by the estuaries of rivers. The 5 fathom line is fairly parallel to the coast and is 2 miles wide. Also it is low and sandy with huge and rugged rocks cropping up in places. All these are in sharp contrast to the east coast which is a sandy waste stretching monotonously for miles on end without any minor cliffs to relieve the dreariness.

The continental shelf of the coast at the port of Shirur is studed with dangerous rocks which extending to a depth of 7 fathoms makes this coast unsafe for coasters to approach under 10 fathoms. From Coondapoor to Mangalore the whole coast is sandy. There are a few rocky islands at 2½ miles from the nose at Malpe (Udipi) and falling entirely within the 5 fathom line. Of the three islands known, Dheriabahadurghar is 70′ above the sea. They are all Basaltic. The same outcrop of Basaltic rocks is again seen in the Mulki rocks 11 miles south of St. Mary Isles and 4 miles from the mainland. This is elevated 40′above the sea.

Between Suratkal and Mangalore the intermediate shore is straight and sandy. Here the 5 and 10 fathom contours are found much further off-shore. Even at depths greater than the 30 fathom line the bottom is composed of sand and rock. The bar at Mangalore has only 6 or 7 feet of water on it so that only small vessels can enter.

From Mangalore the direction of the coast-line changes to S. S. E.

Between Mangalore and Bekal the bars of the rivers are shifting. North-West of Bekal the sea breaks on rocky cliffs 100′ high and has a depth of 4 fathom very near it. But for these reefs of rocks the land rises gradually between Mangalore and Bekal and at 5 miles distance there is the laterite table-land cut up by rivers every 6 or 7 miles.

Between Bekal and Hosdurg a spur of the Ghats of considerable elevation actually reaches the coast. Thus at both ends of the coast-line there are spurs of the Ghats coming right down to the coast and the intervening tract of the low country has an arc-shaped appearence with the convex side pointing well into the interior of the land.

The long straight line of the West Coast of India has been ascribed by geologists to the result of an extensive scarp faulting that occured posterior to the Deccan Trap outflow early in the Cainozoic times; for only so can the abrupt cessation of this deposit be accounted for and that further it assumed its present ontline in the Pleistocene period.

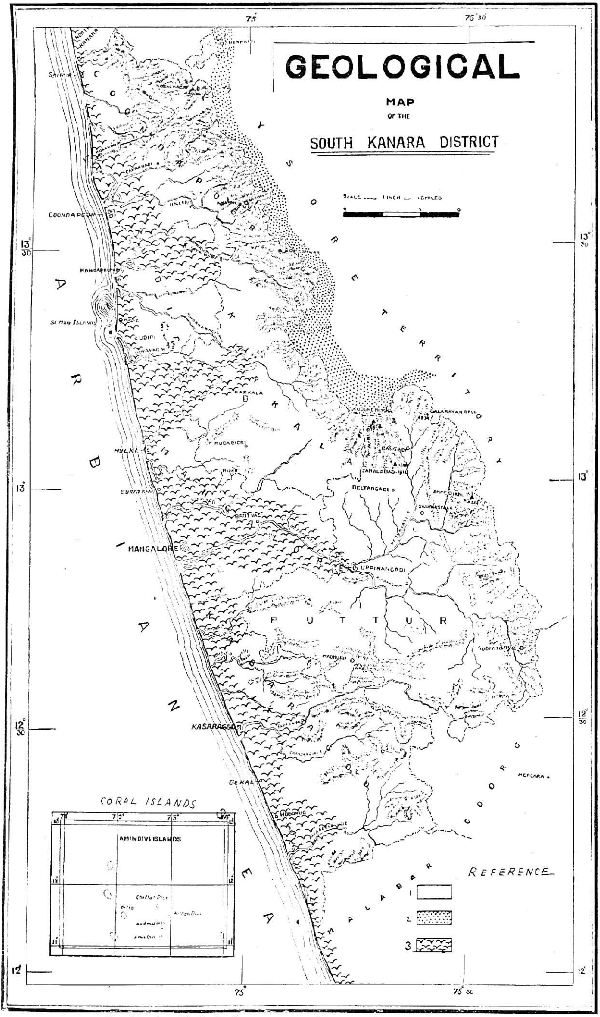
STRATIGRAPHY & LITHOLOGY

The Geology of South Kanara has not been worked at all in detail and the little that is known is obtained from the study of the neighbouring districts to which our area is assumed to partake most of the characteristics. However, more reliable information can also be gathered from the natural sections exposed in the river valleys and from the nature of the rocks themselves.

The Western Ghats which skirt South Kanara from north to south are composed of granitic gneisses of the Archaean Complex with similarities to the rocks of the Nilgiris and Mercara Schists where it touches Coorg—rather quartzose and coarse-grained. Garnet is a frequent mineral in these gneisses.

The river bed of Netravati at Bantval is composed of Hornblende granite along with mica and garnets and intruded by pegmatites with flesh-coloured crystals of feldspar. Outcrops of the gneiss are particulaly marked in the neighbourhood of Karkal and in the S.E. part of Udipi taluk.

The numerous isles on the coastal shelf such as St. Mary Islands and the Mulki Rocks are composed of black basaltic rocks. These have weathered into long and beautiful hexagonal columns



1. Unclassified Archaean crystalline gneiss, granite, etc. (the weathering of these rocks have given rise to the laterite soil forming the intermediate zone between the ghats and the alluvium).
2. Dharwar—schists and traps.
3. Recent alluvial deposits.

and fine specimens are kept in the museum attached to the Kanara High School, Mangalore. Though the relation of these rocks to the gneisses is not apparent, it would appear they occur as intrusions in the gneisses rather than as outlines of the lava sheets of the Deccan trap.

The gneisses all along the Malabar coast, due to the dominance of chemical weathering in the similar monsoon regions have weathered into white, reddish or yellowish feldspathic clayey rocks which ultimately form the *eisenhut* or the laterite cap in these gneissic regions. The change is not a very sharp one and there is every gradation from the fresh unweathered gneiss to the lithomarge and on into the concentrated laterite above.

The Ass's Ear hill or Kudanjakal is composed of limestone but its relation to the surrounding rocks is yet to be understood.

Westwards of the Ghats is constituted the coastal laterite peneplain, of a plateau-like character with a north-to-south trend. It is chequered with outcrops of boulders and even ridges of granitic gneiss. Round Mudabidri is the vast laterite plain.

As regards the origin of this coastal laterite belt one cannot *in toto* accept the ideas that have been formed from the study of other areas. Our ideas regarding the coastal laterite is rapidly changing with the recent work that has been going on on the east coast.

It is clearly detrital in origin when it is mixed with water worn pebbles. At Mangalore and particularly in the sections to the north of the town, the laterite is clearly detrital and reconsolidated. In the Kadri Glen off the Golf Links a pebble bed with matrix of laterite underlies the main laterite mantle. Further north at the Kambla quarry a zone of kaolinised material underlies the laterite but it is uncertain if the base rests on sedimentary rocks as is seen to be the case near Mangalore. Nearer the mountains the detrital laterite has been found to overlie granitic gneissic laterite and therefore the task becomes all the more difficult to trace the actual boundary between the two unless the detrital character is clearly displayed. This detrital belt is confined between 200′ and 150′ and better recognised than the lateritised form of the weathered gneiss. This belt forms the undulating downs with uniform level stretches of forest land and is also broken into low flat-topped hills by the net work of streams. Beyond Someshwar the laterite is not seen.

The next formation is the Warkalai series which forms a characteristic feature of the coastal tract forming long, flat undulations all along the Malabar coast and attains its maximum thickness 180′ south of Quilon. The sequence as observed at Quilon is as follows :—

↑ Laterite (with sandstone masses)—clearly detrital,
Sandy clay (with Lithomarge),
Sandy clay (with sandstone bands),
Alum clays,
LIGNITE BEDS (with logs of wood)
Loose white sand.

? ? ? ? ? ? ? ?

In Kasargod taluk as forming part of the Warkalai Series has been traced to a Lignite Bed and it is probable that they prevail further north also.

The youngest formation in the district is on the coastal area where there are sand dunes mixed with river alluvium which also extends higher up on the valleys as well.

The stratigraphical history of S. Kanara may be summed up in the following sequence:—

STRATIGRAPHICAL SEQUENCE

The formations and rock groups which enter into the Geology of South Kanara District

RECENT	—	Sand dunes and River Alluvium, and shelly limestone with sand.
*TERTIARY	—	Warkalai Series (Laterite/Lignite beds)
ARCHAEAN COMPLEX	—	Granite Gneiss of Nilgiri and Mercara types with intrusions of Pegmatite and probably basaltic intrusions in the present coastal shelf.

It has been assumed that the terrace phenomenon observed in the much worn gneissic region of the country is due to marine denudation which has also determined the general surface of the Warkalai beds. Therefore this marine terrace would be of later

date than the Warkalai beds. The period of erosion marked thus — — — — — — in the general sequence above has also been equated with the formation of Cuddalore Sandstone on the Coromandel Coast. This raises a very interesting geomorphological problem which could be only settled when the region is thoroughly studied in all its geological aspects. In all the major river valleys of the region it has been observed by the author that there are two fine alluvial terraces well developed extending as far as the sea which points out to an eustatic oscillation of the sea in recent times. This is in perfect accord with what has been recorded already by the author on the Coromandel Coast.

ECONOMIC GEOLOGY

The potential mineral resources of this district are practically unexplored and the information that we are able to get is from casual observation. A few of the deposits like clay and laterite are of great commercial value and they clearly indicate the control of geological environment in determining the character of human industries. Besides clays and laterite, the minerals of economic value which the country promises to have are GOLD, GARNET, STEATITE AND CORUNDUM.

LATERITE is the common building and road material and goes by the name of Kadpa Kallu in this district and by Vettu Kallu in Malabar, revealing thereby the nature of the extraction of these rocks from the quarries. All the lateritic occurrences of South Kanara are associated with granitic rocks below them and can be taken as having been formed from such said rocks by chemical weathering. It passes down into the granite through a zone of kaolinised rock. There is a clear concentration of ferruginous matter in the upper parts of the laterite where the tendency is for a pellety texture to develop. Below this is the typical vermicular laterite of red or yellow colours which is as soft as " cheese " in the freshly exposed rock in the quarry and which hardens on exposure after removal from the quarry.

Clays.—The main tile industry of Mangalore is dependent upon the occurrence of suitable clays. They are especially abundant in the alluvial valleys and are of the alluvial loamy variety. The clays are found in the two alluvial terraces of the outer valleys. The clay of the higher terrace is the one dominantly quarried for economic purposes. This fine clay, which is now in great demand among the manufacturers, is found in the higher reaches of the Netravati river. In tile-making it is mixed with sand. It is also

found in the villages of Balkur and Galvadi 6 miles from the town of Coondapoor. This particular variety of clay seems to be specially found in South Kanara. It is chiefly used in the manufacture of tiles, pipes, earthenware and firebricks.

The glazed pottery of Uppinangadi such as cups, saucers and jars form a much prized ware.

Tile-making industry was first introduced by the Basel Mission and now there are numerous factories all over the country. The 40 tile factories in Mangalore are located on the river frontage.

There is also a ceramic industry controlled by the Commonwealth institution. They are experimenting with white clay (obviously a product obtained from the weathering of pegmatites) in the hope of eventually being able to produce porcelain.

I am indebted to Mr. W. Kruger and Mr. J. R. Fowler, the Group Manager, Commonwealth Trust, Ltd., Mangalore for taking me round their tile works and supplying me with some information. The correct analysis of the river clays appear to be a trade secret. However, an approximate analysis of the clay found in the quarries was supplied by Mr. W. Kruger as follows :—

$Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$ ⟶	55 to 60%
SiO_2 ⟶	25 to 27%
$CaCo_3$ ⟶	4 to 6%
Loss on ignition ⟶	7 to 12%

The relative proportion of the alkalis to silica is deliberately omitted. This is a very important one ; for a difference of 1/4 per cent only in the amount of alkalis present in the clays will be a very serious point when a selection is to be made between two clays of similar composition or where a clay of exceptionally high resistance to heat is needed.

Gold is known to occur in one or two places in the alluvial washings of streams near Mijar in Mangalore taluk and near Madnur in Kasargod taluk on the road from Mangalore to Mercare and probably elsewhere. There is very little hope of discovery of rich alluvial gold deposits in this monsoonic region. For the alluvial concentration of Gold, a comparatively equable current is essential—a condition rarely obtainable in the gravels of the rivers of the Peninsula which has torrential floods in the rainy season and is dry in the cold weather.

Garnets are found in the Kumardhari river 3 miles from the temple of Subramanya—used as a gem stone in the place of rubies.

Steatite or Talc occurs in the Manavalike village in Puttur taluk and in Nerankimagane in Uppinangadi taluk. Mr. Bosworth Smith who examined a quarry of 600 square yards, quoted in 1889 that it was a fairly hard stone, free from grit, and might do for cutting but would not do for a lubricant. It is a pale buff with reddish specks in places; schistose, cuts freely in thin laminae parallel to foliation but not across it. Fine culinary vessels made out of potstone from karkal and other places have been exhibited in the special exhibition attached to the conference. Corundum occurs in some parts of the district. A big crystal is kept in the school museum as coming from the district but the locality is not indicated.

Lastly, *soils* play an important part in the economic Geology of any country.

The name of Kanara which is indicative of the black colour of the soil has nothing to tell anything about the soil of South Kanara. It merely indicates the political dominance of the Kanara rulers in the historic past over this part of the country.

The soil is as a rule a lateritic loam which is especially rich in the lower stretches of valleys where there is best rice cultivation. Long stretches of level ground occur along the coast where the soil is generally of a sandy character but contains much fertilising alluvial matter. Generally to the north of the Chandragiri river the land is more fertile than the soil in the south where it is also thinner.

The laterite in the plateau bordering the coastal alluvium is formed on the granitic bed. It represents the residual product of chemical weathering. Much of the level plateau above the valleys have granite bosses outcroping through the laterite and produce nothing but thatch grass and stunted scrub.

Good water is available at depths on the plateau region and in the coastal plain at depths varying from 20′ to 50′ but is contaminated at times with the ferruginous material derived by the circulating waters in the laterite. The water table varies up to 40′ between the monsoonic and non-monsoonic seasons.

Every valley has one or more water channels running through its centre or the sides and the best rice field known as Majal lie on a level with these channels which feed them by small openings

in their embankments that can be controlled by men. The land under terrace cultivation in the upper portions of the valleys are known as Bettu.

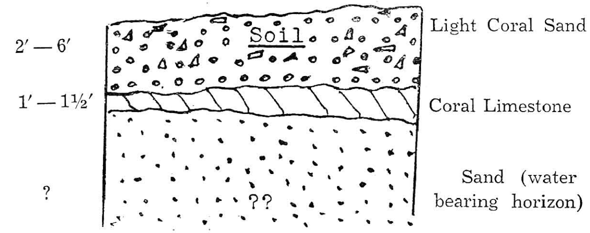
Thus even the agricultural methods of South Kanara are conditioned by its climate and geological peculiarities.

AMINDIVI ISLANDS

This group of islands—Chetlat, Kiltan, Kadomat, Amini, and Bitra—form the northern group of the Laccadives and are attached to South Kanara. It is separated from the mainland by 170 to 200 miles. The islands run parallel to the coastline. They are all inhabited each with an area of 2—3 sq. miles.

Each is situated on a coral shoal with a lagoon on the west and they nowhere rise to more than 10′ to 15′ above the sea-level and their surface is everywhere flat. Around each island there is an extensive fringe of coral reef extending broader and more shelving on the west where the island naturally requires protection, and narrow and abrupt on the east.

The foundation of the soil in these islands is a stratum of coral limestone which varies from 1 to 1½ feet in thickness and is above the highest level of the water. Beneath this crust there is a layer of wet sand and by scooping out sand the water accumulates in a pool. The water in such wells and pools is quite fresh and abundant though not very wholesome.



The soil is composed of light coral sand and sometimes of loose pieces of coral. This soil is only fit for cocoanut plantation and the prosperity of the island depends on this.

The dwelling houses are everywhere built of coral limestone.

Origin of the islands :—The nature of the bases on which the Laccadives, Maldives, and Chagos Archipelagos are perched can only be guessed since there is no true land in any island of these groups. Each chain of islands marks the line of a great mountain range. The corals cover the mountain peaks, the actual topmost parts of the range being at some and possibly a great depth below the surface. In the course of its growth the coral has here formed beautiful atolls and lagoons.

It seems possible that the Laccadives have different origin from that of the Maldives; for the recent work of Lieut. Col. E. A. Glennie of the Survey of India on the geodetic character of the Laccadives and Maldives group has proved that this differs in the two Archipelagos, a positive variation being found in the Laccadives, and a negative variation in the Maldives. Glennie draws the conclusion that the Laccadives are perched on an *Upthrust* that may be the continuation of the Aravalli mountain chain—the oldest mountain range in India. The Maldives on the other hand appears to be situated on a deep seated *Downwarping* and the ridge may be of volcanic origin.

Whatever the nature of the basic rocks of these ridges, it is not improbable they were once a part of the mainland and become separated from India by a fault the line of which is now marked by the Laccadive Sea and on Wegener's theory these left behind and became submerged when India drifted away towards the north-east.

CONCLUSION

In closing this sketch of Physiography and Geology of South Kanara district certain facts have to be borne in mind.

The division into taluks is neither based on historical nor ethnic nor even geographical grounds but is merely the product of administrative convenience. The addition of the Amindivi islands to the district adds nothing to its homogeneity.

The geography of the district forms part and parcel of the entire Malabar coast. The mountains that form the bulwark on the east form the escarpment of the Mysore Plateau and no height can be called a mountain in its true geological sense.

The rock-formations are simple and few but their inter-relations are not yet worked out in detail. The lateritic plateau and the sandy coastal tract have been added in recent geological times which seem to have emerged out of the sea, in the process of which, terraces have been cut by marine denudation. Strangely there is a tradition among the people that the entire west coast has been wrested from the see by the mystic person Parasurama by swinging his axe on the sea as far as his hands could reach. This story is well corroborated by geological facts.

The rivers of the region though very short have cut deep channels which prevent disastrous flooding in monsoon times. They are all tidal and have formed big estuaries which make a cheap means of internal communication possible along the coast and navigation inland for 10 to 15 miles up the rivers.

Though irrigation reservoirs and permanent dams are impossible owing to the very heavy rainfall, springs and streams have been skilfully utilised by a number of channels and feeders. Along the coast irrigation is largely done by shallow ponds scooped out of the sandy soil. Good water-supply is also available between 20′ and 50′ of the surface though contaminated by ferruginous matter derived by the circulation of underground water passing through laterite area.

Among the economic deposits which have influenced the local industry, alluvial loamy clay occupies a very important place. Tile is manufactured out of this clay and this is the key industry in the whole district. As the special clay deposit is up the Netravati, the tile factories are all situated on the river banks which again makes easy transport of products from one port to the other.

Still our knowledge of local geology is meagre and the mineral wealth not properly explored. In 1800 Sir Thomas Munro said that South Kanara would never be a manufacturing country because it produces none of the raw materials and that the very rainfall was an insurmountable obstacle, to all the industrial operations which required to be carried under a clear and open sky. I feel that till the Basel Mission introduced tile manufacture from the local clay deposit, the opportunity was there but the genius was lacking on the part of the indigenous people to perceive the utility of raw products.

If only a thorough survey of the country is undertaken it will not be long before we can find out the actual potentialities regarding the country's mineral resources. No doubt gold has been found

in the washings of streams but nobody has found out its real home in granites where it may be economically possible to work out those areas, even as Mysore is doing on the other side of the frontier. It is only a question of time for any country to move forward with the up-to-date industrialised methods and planning of the rest of the civilised world, where there are plenty of opportunities, skill, finance and other favourable conditions.

So Mangalore has her own many unsolved problems even in the fundamental basis of the physical and economic aspects of her geography. The scope for improvement is however great and effort if properly directed is bound to achieve success.

As recently as 1929 the Municipality of Mangalore has already paved the way for an intelligent understanding of her environment by a modern civic survey of Mangalore in all its aspects; and this work should not be allowed to lie over till the other taluks have been brought into alignment with Mangalore.

This article will be followed soon by another giving a detailed study of the rock types and sections across the district which will complete this preliminary Geological study undertaken for this Conference.

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The Climate of South Kanara

By

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The study of the climate of any region should normally be preceded by an exposition of structure and relief and similar basic factors; but as these have been fully discussed in a separate paper by Mr. V. D. Krishnaswamy published above, I have avoided repeating them here. It may, however, be stated at the outset that this district is part of the West Coast region of India lying between the districts of Malabar and North Canara and the Western Ghats on the east and the Arabian Sea on the west, and that the land slopes from about 400′ at the foot of the Ghats to about 100′ near the sea and that it is cut up by the valleys of the quick flowing rivers of the district.

There is only one Meteorological Station in the district at Mangalore, which gives us the data for temperature, pressure, wind velocity, direction of winds etc; and we have to take that as typical of the whole district. Rainfall, however, is registered in 11 stations in the district. With the help of these and the figures registered in stations in Mysore situated near the border line of South Canara, the isohyets of average annual rainfall have been drawn.

Table I gives us the monthly average, maximum, minimum and mean temperatures as recorded at the observatory at Mangalore. The mean annual temperature is 81° and in no month does the mean monthly temperature vary from the annual mean by more than 5°. The figures reveal to us that there is a steady increase of monthly temperatures till April, and that April and May are the hottest months. The onset of the monsoon in June brings about a sudden fall of 5° of temperature, which goes on decreasing through July and August. There is a rise again to a secondary maximum in November, when the monsoon has ceased. From this maximum commences a fall which continues till January, corresponding to the sun's apparent movement towards the south. With the sun's northern movement, again the upward march of temperature begins. It is interesting to note in this connection that the lowest monthly temperature is recorded in the summer month of August when the sun is overhead and not in January, the mid-winter month. The mean diurnal range of temperature is highest in the dry months of December and January, and then goes on decreasing through the monsoon months till a minimum is reached in July-

August, after which it increases. This is due to the fact that in the rainy months, the cloudy sky and the humid atmosphere impede the insolation during the day and check radiation during the night. During October, November and December the sky is relatively drier, so that both the insolation during the day and radiation during the night take place to a greater extent, so that the mean monthly maximum goes on increasing and the monthly minimum decreasing.

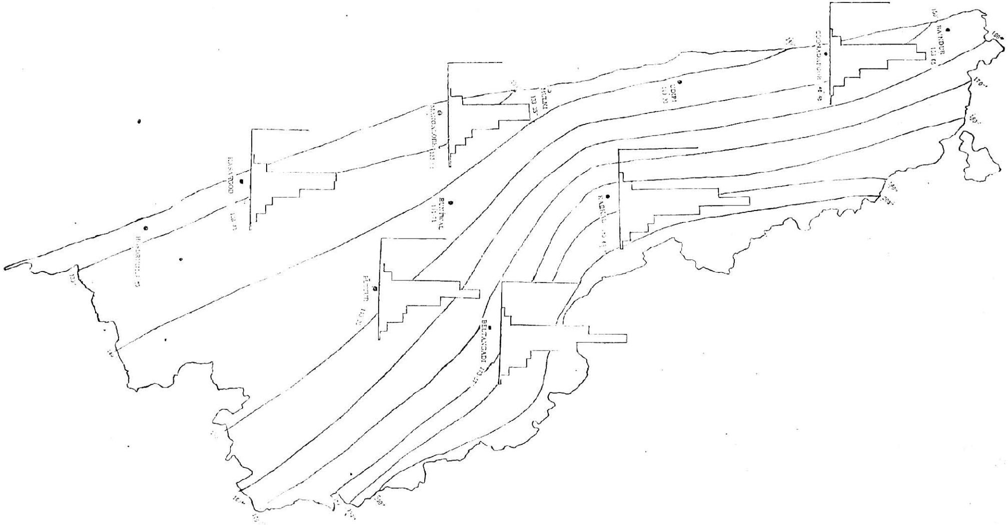
In this connection it would be interesting to compare Mangalore with Madras on about the same latitude on the east coast. The mean annual range for Madras is 13·2° whereas it is 6.2° for Mangalore. In Madras winter happens to be the rainy season, and summer the dry season, whereas the reverse is the case in Mangalore. Hence it is that Madras shows a higher range of temperature than Mangalore.

Table II gives us the figures for Mangalore of monthly pressure, wind velocity and direction, humidity and cloudiness observed at 8 a. m. These figures should, however, be interpreted with great caution as they indicate the conditions at 8 a.m., and so are not representative of the whole day. For instance, the wind velocity has an easterly component at 8 a.m., as it is then blowing off-shore and therefore the East appears as the prevailing direction of winds. It is only in the monsoon months that the seasonal influence of the on-shore winds overpowers the land breeze.

The pressure is highest in January (mid-winter) and lowest in July (mid-summer). For the first three months of the year the winds blow from the east and north-east with a low velocity and then they change to northerly in May. In June when the south-west monsoon is vigorous, the winds blow from the south-west or west; while in July there is in addition a north-westerly component. After the monsoon months the winds steadily run through the north to north-east in the dry cold months with a progressive decrease in velocity.

The humidity is high throughout the year. It is only in the winter months of December and January that it goes below 70%. In other months it varies from 70% to 90%. The conditions represent the coastal region only and hence are not representative of South Canara as a whole. Higher up, towards the Ghats the air is no doubt less humid due partly to elevation and partly to the distance from the sea.

The amount of cloudiness closely corresponds to humidity, being highest in the monsoon months and least in the first three months of the dry period. It is the excessive humidity especially in the monsoon period that makes the weather so sultry and



Rainfall Map of South Kanara

oppressive, even though as stated above the climate is more equable compared to Madras.

Let us take the rainfall of the district next. As already referred to, there are 11 stations in the district registering rainfall. Of these 7 lie along or near the coast, while the remaining 4 lie in the interior. Hence stations in Mysore lying near the crest line of the Ghats were also taken into account in drawing the map of the annual isohyets, which show a trend corresponding to that of the Ghats. The isohyets showing rainfall over 160″ are only approximate. A series of rainfall graphs for typical stations are also shown on the map. From this map it is clear that rainfall generally increases northwards and eastwards.

Considering the rainfall regime, there is an increase of even the meagre rains of April and May from south to north along the coast, and later on the same tendency is to be seen in the fact that the June maximum in the south changes to that of July in the north. This July maximum, which is the prevailing regime of the district as a whole is far better seen in the case of inland stations towards the Ghats than in the coastal stations of Mangalore and Mulki. This is because the monsoon touches the coast earliest in the south and progresses slowly northwards and inwards in July.

There is little rain in the 4 months of December, January, February and March. As has been neatly stated in the District Manual, there is some rain, variable in amount, but usually light in April; but the burst of the monsoon, subsequent to which the rain falls in almost incessant torrents, rarely occurs before the last week of May. Throughout the following months—June, July and August—the rainfall is very heavy, but it abates during the remaining months; occasionally there are breaks or comparatively rainless intervals, at which times the heated atmosphere becomes charged with the vapour arising from the saturated soil—a condition favourable to the production of malaria. In the months of October and November the retreating monsoon accounts for the rain in those months. It is necessary to note in this connection that there is no secondary maximum as in the case of places in the Deccan as the two monsoons coalesce and produce a continuous effect in this district. It is only in December that the dry season becomes definitely established.

The average annual rainfall for the whole district is 145·47″, which is higher than that of any other district in the Presidency. South Canara is thus found to be an exceptionally favoured district, and famines are almost unknown as in Malabar for the same reason. The rains during the south-west monsoon are so plentiful that there is hardly any necessity for storing water for cultivation

as in the other districts of the Presidency. In fact, rice is raised here by means of rain alone, and that without the aid of artificial irrigation like the tank irrigation in the east coast region.

TABLE I

Average Maximum and Minimum temperature in degrees F for Mangalore.

	Max.	Min.	Mean	Range.
January ...	89·2	70·6	79·9	18·6
February ...	88·6	72·3	80·5	16·3
March ...	90·1	75·7	82·9	14·4
April ...	91·7	78·4	85·1	13·3
May ...	91·3	78·7	85·0	12·6
June ...	85·3	74·6	80·0	10·7
July ...	83·9	74·1	79·0	9·8
August ...	83·7	74·1	78·9	9·6
September ...	84·5	74·1	79·3	10·4
October ...	86·1	74·5	80·3	11·6
November ...	88·2	73·4	80·8	14·8
December ...	89·3	70·8	80·1	18·5
Annual ...	87·7	74·3	81·0	13·4

TABLE II

Average monthly pressure, relative humidity, cloud, wind velocity wind direction at Mangalore as observed at 8 A. M.

	Pressure in inches	Relative humidity	Cloud in tenths of the sky	Wind veloicty in miles per hour	Wind direction
January ...	29·869	67	2·1	3	E
February ...	29·855	72	2·1	3	NE
March ...	29·820	72	2	3	E
April ...	29·771	70	4·1	3·1	ENE
May ...	29·743	74	6	3·5	N
June ...	29·705	88	8·4	3·5	SW
July ...	29·719	90	8·7	3·3	SW & NW
August ...	29·753	90	8·3	2·6	ENE
September ...	29·778	87	7·3	2·4	E
October ...	29·795	83	5·6	2·5	E
November ...	29·821	75	3·8	2·5	E
December ...	29·855	66	2·5	2·9	E

TABLE III

Average monthly rainfall in inches for stations in the South Kanara Dt.

Station		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1. Hosdrug	...	0·09	0·13	0·09	1·85	6·46	39·93	39·01	21·67	9·19	6·82	3·08	0·47	128·79
2. Kasaragod	...	0·18	0·09	0·10	1·53	7·09	38·43	37·89	22·40	10·03	7·12	2·97	0·60	128·43
3. Puttur	...	0·26	0·11	0·32	1·91	5·86	36·37	45·37	27·40	12·19	10·69	4·10	0·65	145·23
4. Beltangadi	...	0·09	0·07	0·25	2·12	5·14	39·78	57·86	35·48	14·81	12·42	4·79	0·76	173·57
5. Bantwal	...	0·08	0·05	0·04	1·37	4·48	39·33	45·56	26·68	11·21	8·79	3·33	0·79	141·71
6. Mangalore	...	0·06	0·06	0·08	1·28	6·20	36·78	37·11	22·54	10·42	7·53	3·12	0·50	125·68
7. Mulki	...	0·09	0·06	0·02	1·27	5·85	38·96	40·70	24·65	11·54	6·76	3·02	0·43	133·35
8. Karkal	...	0·18	0·02	0·15	1·98	5·90	45·84	59·82	37·08	15·87	12·98	4·62	1·03	185·48
9. Udipi	...	0·13	0·06	0·03	0·95	5·44	38·52	44·63	27·10	13·18	7·54	2·34	0·41	140·33
10. Coondapoor	...	0·16	0·05	0·07	0·74	5·43	39·76	44·24	26·70	13·77	7·13	2·06	0·37	140·48
11. Baindur	...	0·10	0·03	0·01	0·62	4·69	41·53	51·96	30·22	14·11	7·15	2·83	0·40	153·65
Dt. Average	...	0·14	0·07	0·10	1·43	5·71	39·65	45·91	27·51	12·45	8·65	3·27	0·58	145·47

The Forests of South Kanara

By

Mr. Rao Sahib E. V. Padmanabha Pillai,

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1. South Kanara lies between 12° 4′ 15″ and 13° 58′ 30″ North latitude and 74° 43′ 26″ and 75° 44′ 31″ East longitude. It is interesting to note that Madras, Bangalore, and Mangalore are in the same latitude.

South Kanara is 150 miles in length, about 25 miles broad at its narrowest and 50 miles at its widest part. The eastern boundary of South Kanara is the water-shed or the scarp edge of the Western Ghats. This boundary is the backbone, as it were, of the Western Ghats. This is broken through by rivers Kumaradhari, Sisla, Varahi-Nadi and Chakra-Nadi and the main watershed of the Western Ghats recedes into the interior of Mysore State. On the boundary between Mysore and South Kanara, there are five important peaks. They are Ammedikal (4267 Ft.), Balaraya Kotta (4934 Ft.), Kudremukh (6215 Ft.), Walkunji (3413 Ft.) and Kodasadri (4411 Ft.). The Kaveri rises near the boundary of South Kanara in Coorg. The Thunga and the Bhadra which unite further down and become the Thungabhadra also have their sources near the border of South Kanara in Mysore State. The important rivers of South Kanara are the Chandragiri (which separates Malayalam country from Tulu Nad), the Netravati, the Gurpur river, the Suvarnanadi, the Sitanadi (which separates Tulunad from Canarese country), the Chakranadi, the Varahanadi and the Kollur river. There is a tendency for some of these rivers to unite just before they fall into the sea and form a kind of backwater along the coast, not to such an extent as in Cochin and Travancore. There is a portion of South Kanara which is surrounded on all sides by Mysore State towards the northern end of the District. It is known as Hannar Magane. There is no road connecting South Kanara with Malabar near the Coast. Sampaje Ghat Road leads from Mangalore to Mercara and to Mysore on one side and Tellicherry or Cannanore. Good Ghat roads through Ghats known as Baisly, Shiradi, Charmadi, Agumbai, Hosangady and Kollur connect various parts of South Kanara with Mysore State. There is a road connecting South and North Kanara near Shirur.

2. When coming from Madras to Mangalore, you probably travelled by Malabar Express and as you were sleeping till the train arrived at Podanur, you missed the scenery of the East Coast. But I dare say, you know it too well and you noticed the change in the landscape when you passed the Palghat gap. Though the temperature on the east coast is at least 10 degrees higher than that of the West coast during this time of the year, you will not believe it, as the heat here is more oppressive and uncomfortable. This is due to the excess of humidity in the atmosphere here. The annual rainfall in South Kanara varies from 125 to 200 inches and a climate like this is very favourable to the growth of vegetation. Hence the west coast is a country of forest and the whole surface of the land is covered with green foliage. Of all the Districts in Madras Presidency, South Kanara receives the heaviest rainfall and it is in South Kanara that we have some of the finest tropical ever-green forests. In a land so richly endowed by nature, so attractive to the eye, it would be too much to expect that its fortunate inhabitants should suffer no environmental disadvantages. Nor do they escape entirely the ills of their comrades in less favoured districts, since, except in a narrow belt along the seaboard, Malaria is widespread, and its incidence increases with the increasing wealth of the vegetation, reaching its culminating point in the dense forests of foothills and outer slopes of the ghats.

3. In Indian Mythology, the west coast of India is known as "Parasurama Bhoomi" as it is said to have been reclaimed from the sea by sage Parasurama. There is some truth in this story. There are signs, in various places, that the sea used to beat the sides of the Western Ghats, and that the whole of the land up to the Ghats was once under the sea. The country below the Ghats was formed by the denudation of the sides of the mountains by the sea and the silt thus formed under the sea. When the sea receded finally by a sudden geological convulsion the land exposed was a table-land of red clay with an elevation of about 400 feet at the foot of the Ghat sloping gradually westwards to about 100 feet near the coast. Heavy rain and mountain streams cut up this soft earth into thousands of deep valleys—gradually vegetation appeared and prevented further denudation of the soil which became hard by heat and exposure and the typical South Kanara laterite was formed. South Kanara is a country of hills and dales and extensive plains are never to be seen. Man did not follow Parasurama as soon as this new land was formed. He followed probably several thousand years later when the land was covered with impenetrable forest.

4. When man first appeared he very probably settled down near the new sea coast and cultivated the alluvial valleys near the rivers. With the increase of population, cultivation extended into the interior, following up the main streams and their numerous tributaries. Man's chief enemy then was the forest, which not only grew luxuriantly everywhere, but harboured wild animals. So he started to cut and burn as much forest as possible. When the fertility of the virgin soil diminished, his crop began to fail and he had to manure the soil. Then he saw the forest which surrounded his field in a new light. These forests yielded manure, so he commenced to conserve the forest around his cultivation—hence commenced the "Kumkies" of South Kanara.

5. Owners of cultivated land in the valleys commenced to preserve forest growth on either side of their fields for obtaining manure, and they claimed this as a right, up to the top of the ridges on either side of the valley. This claim was known as "Netti Kattu." As there were no forest laws or regulations, no one interfered with this claim till about 1860, when definite orders were issued by Government, limiting this to 100 yards around cultivation, which extent alone was admitted as a privilege, and is known as "Kumki," which means "aid," to cultivation. Kumki land is Government land for the enjoyment of which no assessment is paid by the cultivator. The cultivator is allowed to remove, free of charge, manure leaf and timber of trees not reserved by Government. Even reserved trees are given free for his own use, but not for sale. If the cultivator wants to obtain his "kumki" land on darkhast, he is not required to pay the value of the tree growth on the kumki. It is interesting to note here that when a similar claim was made in the adjacent District of North Kanara in Bombay Presidency, it was not admitted and the Bombay High Court gave a ruling disallowing the claim. By this concession most of the cultivators conserved the tree growth in their kumkies and these are valuable assets. This kumki privilege is peculiar to this District and is not allowed anywhere else in the Presidency.

6. The people who occupied the land for the first time were the aborginal tribes known as 'Malakudies,' Holeyas etc. Then started the gradual penetration of civilised Dravidians and Aryans. civilization always involved dispossessing the weak, and kicking them to the wall. So all the fertile cultivable and cultivated land passed into the hands of these civilised people, who still enjoy it,

and the helpless original owners were driven into the jungle. These people started what is known as "Kumri" or "Podu" cultivation. This is simply clearing the virgin forest, burning the felled trees and sowing rice, ragi, dhall etc., after the fire has died out, without any previous preparation of the soil. As the quantity of the ashes available was considerable, agricultural crop flourished and all that the "Kumridar" had to do was a little weeding and protection of the crop from wild animals. He then left that area and selected another virgin forest close by. When all the available virgin forest in the neighbourhood was felled and cultivated, he went back to the area which he had originally cleared, perhaps ten, twenty, or thirty years before. By that time re-growth of forest had appeared, helped by the heavy rains which are a feature of the District. In this way, all the good forest was cut and burnt, over and over again. Even Government encouraged this kind of cultivation, and collected assessment from such cultivated land till 1860. The result of this kumri cultivation is that at present virgin forests are to be found only in the inaccessible high steep slopes of the main ridge of the Western Ghats. The rest of the area under forest, about 90 per cent of the total area, is the result of re-growth following kumri cultivation, and consists largely of seriously degraded jungle not capable of producing large timber in the near future.

7. When the claim of kumki privilege was up to the top of the ridge (Netti Kattu) on either side of the valley containing land under permanent cultivation, most of the forest area near the cultivation was protected by the kumkidars. When kumki privilege was limited to 100 yards from the boundary of the field, extensive forest areas which were under the protection of cultivators became "no man's land" i.e., Government land, pure and simple, for the protection of which no one was particularly responsible, and everybody became greedy to make the most out of it, at the earliest possible opportunity. This was the commencement of the degradation and ruin of the Government forest. In those days there was no Forest Department, and the forest was under the Revenue authorities. This state of affairs went on till 1882 when the Forest Act was passed and a new department created to manage the forest.

8. The first task of this new department was to conserve as much as possible of the forest area then in possession of the Government, always taking care to see that sufficient forest areas near cultivation were left for the enjoyment of the agriculturists. The

areas thus conserved are known as "Reserved Forests." Reserved Forests are constituted after very careful enquiry into the rights and privileges of the people. The rights which are admitted are mostly rights of way and watercourse. These reserved forests are under the management of the Forest Department. The forest left for the use of the villagers is known as "Unreserved Forest" and is in charge of the Revenue authorities.

9. The total area of the District of South Kanara, including all description of land, is 4021 square miles. The total area of the Reserved Forests in South Kanara is 807 square miles. The total area of unreserved land in charge of the Revenue authorities left for the benefit of the villages, is 1602 square miles. The area of occupied land, i.e., patta land, is 1612 sq. miles, of which only 934 square miles are under cultivation, wet and dry. Of the occupied land, about 60 square miles are forest areas in possession of private owners.

10. The reserved forests are mostly located along the eastern boundary of the District, i.e., along the western slopes of the Western Ghats and foot hills. Of the six taluks of the District, the taluks of Mangalore and Udipi have practically no reserved forests. The main object of maintaining these reserved forests is climatic, i.e., protecting the sources of rivers and hill sides from denudation and erosion. Some of these forests are potential timber forests also.

11. Important trees found in the district are :

(1) Sandalwood, mostly in the unreserves.
(2) Teak—mostly in Kasargod and Puttur Taluks.
(3) Rosewood—throughout the district.
(4) Hopea parviflora—Kiralbhogi—all over the district; This is a very important tree and very useful.
(5) Terminalia tomentosa—Karimarudu, Banapu, Mathi—all over the district.
(6) Terminalia paniculata—Marwa, Pillamarudu—all over the district.
(7) Artocarpus hirsuta—Hebbalsu, Aini—an important useful timber—all over the district.
(8) Xylia xylocarpa—Irul—all over the district.
(9) Lagerstroemia lanceolata—Venteak, Bilinandi—all over the district.
(10) Calophyllum elatum—Poon, Srihonne—a beautiful tree growing strait to large dimensions up to 200 feet

and 16 feet in girth—confined mostly to high hill slopes.

(11) Poeciloneuron indicum—Baligai—a large evergreen tree high up in the hills. Young ones are made into good walking sticks.

(12) Mesua ferria—Nagasampige—very useful evergreen tree, growing in its natural state high up on the hills, but cultivated also in the plains for its flower.

(13) Vateria indica—Dhupa—all over the district.

(14) Cashew tree—an exotic tree introduced by the Portuguese from South America in the 16th Century. Now growing wild all over the district.

In addition to these, there are hundreds of other useful trees such as Jack, Mango, etc.

The chief wild animals found are:—Elephants confined to the taluks of Kasargod and Puttur only; Bison, tiger, panther, wild pigs, Sambhur, spotted deer (rare) and jungle sheep, or barking deer.

Among game birds—imperial and green pigeons, pea-fowl, jungle fowl and spur fowl are common.

King cobra, Common cobra, Python, Russel's viper and several other kinds of snakes are found in forests.

12. The Forest Department supplies sleepers to the Railways, and timber firewood to important markets like Mangalore, Bombay etc. Sandalwood is collected and sold every year. Bamboos, canes, honey and wax, Rampatri, cinnamon oil and cashew nuts are other important forest products. Naga cane is a variety of cane very much valued by the public and it is found only in the forests near Subramania. Cutch or Kath, used chiefly for chewing along with betel, is manufactured from a tree—Acacia Sundra—found in the forests of Coondapur Taluk of this district. It is made nowhere else in this Presidency. Dhupa butter made by the local people from the fruits of the Dhupa tree is another special product of the South Kanara Forests. Cardamom is allowed to be cultivated inside the Reserved Forests. Thousands of acres of good forests fit for planting cardamom are available. Already there are some plantations inside the reserved forests. Long term leases of suitable areas of forest land are given, on favourable terms, to cardamom cultivators and the Forest Department encourages applications for such leases.

In improving the value of the reserved forests, several thousand acres have been planted with kiralbhogi. Every year about 200 acres of teak plantations are formed. In planting teak, wherever people are available, they are allowed to raise agricultural crops like rice, ragi, dhall etc., for one year, during the year of planting. Cashewnut has become a very important commercial product of the District giving employment to thousands of people. In spite of this, in very few places only, if at all, do the people plant the cashew tree as a business concern. To show that the cashew tree can be grown at very little expense in practically all kinds of soils, the Forest Department has commenced to plant cashew in several scattered reserves adjacent to villages. This year over 150 acres are being planted. It is for the edible nut that the cashew tree is valued, but the dry leaf of the tree makes good manure for agricultural land. In addition to the nut the tree yields a fleshy fruit, at present little used, but which is suitable for the production of power alcohol, and would, no doubt, be used for this purpose should an emergency ever arise which would restrict the import of petrol.

13. The total area under cultivation in South Kanara is 934 square miles of which wet and garden land is about 600 square miles. For the benefit of this cultivation, there are 678 square miles of private land, not under cultivation—either containing forest growth or capable of growing forest. Then there are 1602 square miles of Unreserves and poramboke land including kumki left entirely for the people. With all these, a systematic agitation has been going on that the area of reserved forests is too much and that there should not be any reserved forest within at least one mile of cultivation or habitation.

14. At present only some of the kumki land is protected by the people. Kumki lands have been destroyed in several villages during the past few years. This is due to the improvement in transport facilities. Kumki land is given on darkhast free of tree valuation to the owner of the cultivated land to which the kumki is attached. In most of the kumki lands, valuable timber trees have been preserved. The kumkidar is allowed to use these trees for his own use and is not allowed to sell them. In order to sell the tree growth, he takes the kumki on darkhast and sells the trees. He wants to make immediate profit and does not care for the welfare of the future generation. In this way hundreds of kumkies have disappeared during the past few years. Unless this system of giving kumkies on darkhast is soon stopped, all the kumkies as such, will disappear within a short time.

15. Unreserved Poramboke land is 'No man's land'. Everybody is welcome to do whatever he likes there. In several such forests there are valuable timber trees. These were being systematically stolen. This is the property of the Government the value of which ought to go to the public treasury. Seeing the State of affairs, in 1931, I got the sanction of the Government to exploit all the mature trees in the unreserves; and up-to-date timber worth over eight lakhs of rupees has been sold and timber worth a few lakhs more is available. It is to be understood that only mature timber is being extracted and all the young trees are left unfelled. The people do not show any interest in protecting these unreserves which are left for their benefit. On the other hand they are systematic in destroying it. For every acre of cultivated land, there are 1½ acres of unreserved land available.

16. In the case of private forest, protection is still worse. A forest tree takes about 100 years to mature. Is there any one in the world who will take the trouble of ensuring the interests of his great grandson by spending money and planting trees? In these parts the system of inheritance also is peculiar. A Karnavan or Ejman gets the family property for management when he is nearing the end of his earthly span. He knows that his sons or grandsons do not inherit the property, but only his nephews. So he tries to make as much money as possible during his short regime. He sells as many trees as possible from his forest. This kind of exploitation goes on without ceasing and the forest deteriorates progressively. In South Canara there are only about 60 sq.miles of private forests mostly owned by a few families in Kasaragod and Puttur Taluks. In Malabar there are thousands of square miles of private forests. In fact, most of the forests in Malabar are owned by private individuals. They are all very important rain forests; and they are all being ruined. Gevernment alone can manage them for the benefit of the nation, present and future.

17. During the past 30 years I have served in several Districts of the Presidency and I know the conditions of the agriculturists in all these places and I come from an agricultural family. Nowhere else does nature favour the agriculturists as in South Kanara. The Government also has been favouring him to an unusual extent. Where else are these kumki privileges Which other district has got such an extensive unreserve kept apart for the use of the agriculturist? With all these, the leaders of South Kanara have been agitating systematically for more and more privileges from the reserved forests. Government has considered such representa-

tions with the greatest sympathy, and has permitted the people to collect free of charge, even in the reserved forests, both manure leaf and dry wood. In no other part of the Presidency has this been allowed. Even in this fertile land of South Kanara the concessions graciously allowed by Government in the Reserved Forests have reached the limit beyond which it would be impossible to go without seriously reducing the benefits—both direct and indirect—which the forest confers on the whole community, and without imperilling the very existense of the forest for generations yet unborn. It is easy enough to see how a too prolific nature has deluded a backward agricultural community into believing that the forest is indestructible. But the reckless abuse of kumkies and unreserves has now gone so far that it is patent to any thinking person that the forest *can* disappear, and *is* disappearing and that, in the next stage, our generous rainfall becomes our enemy in washing off the soil, silting up the rivers and ruining the rich alluvial flats which produce the people's food. It is, fortunately, not yet too late to stay this process of impoverishment of our bountiful land. The climate of the District is so favourable that all we require to do is to protect the unreserves and kumkies from fire and from excessive cutting of tree growth. If this is done, nature will restore the degraded forest within a comparatively short time.

18. For administrative purposes, South Kanara is divided into two Forest Divisions. The combined revenue of the two divisions for 1937/38 was Rs.2,26,061 and the combined expenditure Rs.1,94,944, leaving a net surplus of Rs.31.117-0-0. The usefulness or the activities of the department should not be judged, as is very often done, by the amount of net revenue produced. As I already explained the chief work of the department is to protect and maintain the forest for climatic purposes. This is a wealth we are preserving for future generations, as an insurance against floods and famine At the same time the financial side is never overlooked. We look upon the forest as our capital and we try to get the interest out of it in the shape of mature trees and other forest products without encroaching upon the capital. Not only this, we improve our capital by planting trees of high value, such as Teak and Cashew, both in replacement of the less valuable species, which we exploit and to rehabilitate localities where the growth has seriously deteriorated through past abuse. We also tend our growing trees.

19. The Forest Department is employing a large number of villagers living in the vicinity of the forests, and this mostly at a

time when there is no agricultural work to do and when such employment is particularly welcome. It is calculated that over two lakhs of units of labour are employed every year i.e., work for over 600 labourers working 300 days in a year. In addition to the above, nearly 200 men are given employment in the subordinate service as Clerks, Foresters, Guards, watchers peons etc.

20. While thanking the Secretary of the Madras Geographical Association, in asking me to write a short paper on the Forests of South Kanara, I have to make a request to the Association, the members of which are eminent educationists in whose hands the task of shaping the destiny of our future generation rests. It is a well-known fact that the tree is one of the greatest friends of human beings; but this knowledge is not put into practice. On the other hand human beings have been destroying trees from the time they got down from them. Look at the monkey. He seems to be fond of breaking down the small branches of trees when he has nothing else to do, or of shaking a tree violently for the mere pleasure of doing it. It is a well known story though the veracity of it is questioned, that when George Washington had the use of a knife for a short time, the first thing he did was to cut down his father's apple tree. This story is useful in showing the general tendency of our children. The first thing a child does when he gets hold of a knife is to cut down the nearest plant as if to test the knife's sharpness. It is very difficult to teach the inhabitant of the West Coast the importance of trees, because trees are found everywhere in this fertile and well-watered land. It is entirely different in the country east of the Palghat Gap. My request is that systematic attempts should be made to teach our children, from the infant standard upwards the utility of trees though I may not say the sacredness of trees, as I fear in these days of communal trouble some people might object to it. If each child plants and protects one tree per year it will be a great legacy to the future generations. I saw from the papers that lately a tree planting day was celebrated in one district. The fact to be remembered is that there is absolutely no use in planting a tree once a year if it is not systematically tended and looked after at least till it is above the reach of village goats. Our children must be made to love plants.

21. My thanks are due to R. S. Browne Esqr. I.F.S., the District Forest Officer, Mangalore South for the valuable help rendered in preparing this paper.

Oil Seeds in South Kanara

BY

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The principal oil-bearing crop in South Kanara is cocoanut. Gingelly, castor, cotton and groundnut are also cultivated, but these represent only a small figure as will be seen from the following statement of acreage and production :

Area : (Acre).

	Cocoanut.	Gingelly.	Castor.	Cotton.	Groundnut.	Total.
1935–36	47072	2643	226	200	15	50156
1936–37	47135	2341	227	190	13	49906

Quantity : (Tons).

	Cocoanut.	Gingelly.	Castor.	Cotton.	Groundnut.	Total.
1935–36	2450	320	30	40	10	2850
1936–37	2500	280	40	40	10	2870

Copra (dried cocoanut) is imported into Mangalore, Kasargode and Udipi, the principal oil milling centres, from Malabar and recently from Ceylon. A good deal of cocoanut oil is imported coastwise from Cochin and consumed chiefly by the small soap factories for making cheap washing and toilet soaps, as the locally made oil apparently is not sufficient to meet the total demand and as its price is somewhat higher than that of the Cochin oil.

Gingelly, castor and ground-nut are crushed only in small quantities to meet part of the local demand. Cotton seed is seldom crushed, as it is fed whole to cattle, a practice which obtains in other parts of India as well. The percentage of oil in cotton-seed is small (compared with copra, ground-nut) and the pressed oil is rather dark and crude requiring much refining before it can be put to any industrial use. But the refined oil, owing to its high price cannot compete with the cheaper oils like cocoanut oil, ground-nut oil etc. Gingelly oil is used for household purposes, but pure gingely oil is seldom available in the bazaar as it is more or less adulterated with groundnut-oil.

A very useful oil-seed found largely in South Kanara and near-abouts is Dhupa obtained from a tree known as Vateria indica. It yields about 40% of hard fat, white to yellowish in colour. The tree grows on road-sides into huge sizes and yields large quantities of fruits but only in alternate years. The seed is never collected systematically for oil extraction but small quantities of the seed which drop from the trees are picked up by the villagers who break them up and boil with water and skim the separated fat and make it into round balls in which form it is sold in the bazaars as an edible and cooking fat. Prior to the year 1914 a German firm had started a factory at Kalyanpur to recover the fat from dhupa seed by extraction with solvents, but this firm had to suspend operations at the commencement of the War and subsequently the factory had to close down. Dhupa fat was exported to Europe where it was used as a chocolate fat and as an ingredient of margarine. It is a good substitute for ghee, owing to its sweet flavour and hard consistence. Some attempts are being made by a firm in Mangalore to export the dried seeds to foreign countries. It should be possible and profitable to carry out the extraction of dhupa fat in a suitable centre, as there will be a good demand for the fat for edible purposes and also as a satisfactory substitute for tallow for making household and toilet soaps.

Another local seed is Hongai, obtained from a tree called Pongamia glabra. It yields a semi-solid oil used largely in the leather industry. It is also used as a lamp oil and as a raw material for cheap soaps.

The cashewnut industry in South Kanara has made rapid progress of late. There are about a dozen factories located principally in and around Mangalore where the roasting of the nuts is done on a large scale, the finished kernels being exported to foreign countries chiefly to America. In the process of roasting the nuts, some of the oil contained in the shell is recovered as a black tarry liquid. This oil is seldom used in the country except for caulking boats and as a cheap wood preservative. It is, however, exported to America under the name of Cardole oil, and fetches a good price. The oil has very high drying properties and is said to be the basis of moulding powders from which plastic articles like Bakelite are produced. The shell oil can also be used for making paints and varnishes. The Kerala Soap Institute has undertaken some experiments on the constitution and properties of this oil. A satisfactory roaster for use on a cottage industry scale has also been designed. The oil obtained by this process is of better quality

than that produced by crude methods. The percentage of oil in the shell is about 35.

As regards the oil milling equipment in South Kanara, according to a recent estimate there are 1093 chekkus of which 701 are worked by manual labour, the capacity of such chekkus being about 15 to 25 lbs. of seed per day. 392 chekkus are worked by bullocks and can deal with 30 to 40 lbs. of seed per charge or 60 to 80 lbs. per day. These country chekkus do not work regularly but only for short periods in the year. The capacity of the bullock driven chekkus is about 4000 tons of seed per year of an average of 300 working days and two charges per day. The hand driven units can crush 1500 to 2000 tons per year. The total crushing capacity of the country chekkus is thus 5000 to 6000 tons annually but the quantity actually crushed in 1935-36 is estimated at 1990 tons consisting of

Copra	..	1725	tons.
Gingelly	..	215	,,
Castor	..	20	,,
Hongai	..	30	,,
		1990	,,

Besides the country chekkus there are also rotary oil mills worked by power. Of these there are 30 in the district and have a total capacity of 6 tons of copra per day of 10 hours. It will be seen, therefore, that although the oil milling equipment is sufficient, it is not put to the fullest use. It is advisable to go into the question of developing the oil-crushing industry in the district and make a thorough survey of the varieties and quantities of seeds available, the quantity of oils consumed and other relevant details.

Essential oils distilled from flowers, herbs, roots, plants and such odoriferous substances, though entirely different from fatty oils, are used largely in perfumes for soaps etc. Flowers such as rose, jasmine and patchouli (leaf and flower) are grown in this district.

If the cultivation of these is extended, it may be possible to set up small domestic apparatus for recovering the essential oils for which there is a growing demand in India from soap factories, agarbatti manufacturers etc.

Fruit-Growing in South Kanara, its Present Position and Future Possibilities

By

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Mainly because of its peculiar geographical position, the district of South Kanara has not enjoyed so far a prominent position as a fruit-growing tract in this Presidency. With the adjoining district of Malabar, South Kanara enjoys a plentiful supply of rainfall and a fairly fertile stretch of land having varied physical factors that should enable the production of a variety of fruits to perfection. Despite these advantages, the development of commercial orchards has been considerably hampered because of the lack of adequate transportation facilities and the considerable distance to primary markets. The districts of North Kanara on one side, Malabar on the South, and Coorg and portions of Mysore to the east, all produce fruits of more or less identical quality as those raised in South Kanara, and further are in a more advantageous geographical position to market their produce in the leading consuming centres of this country.

A review of the present status of the fruit industry in the district, however, reveals that, notwithstanding the above-mentioned drawbacks, there exists enormous scope for the development of fruit farming, provided that the development takes place according to a well-thought out plan. In the formulation of a plan for the future development of the industry, it is necessary to take into account not only the existing fruit resources of the district and its peculiar geographical position, but also the possible trend of development of the industry in the adjoining centres of production.

It is now admitted on all hands that there is a considerable room for effecting a large increase in the consumption of fresh fruits in this country, for insuring a well-balanced nutritive diet to the people. Expansion of the fruit industry to provide fresh fruits of good quality at reasonable rates to the people of the district in a greater abundance than at present is, therefore, both desirable and necessary.

Among the tracts that are comparable to South Kanara in point of climate, Malabar and North Kanara have already establish-

ed a reputation of being the leading mango producing districts, while Coorg and parts of Mysore are known to be the leading producing centres of loose jacket oranges. Malabar occupies the leading position in regard to the production of some varieties of bananas or plantains. In recent years, there has also been a marked increase in the production of pineapples in Malabar. There is also the possibility of Malabar increasing the production of cashewnuts in the next few years, especially if the prices for this product maintains a favourable position in foreign markets.

The main fruits grown in South Kanara at present are mangoes, sapotas, pine-apples, cashew-nuts, and bananas or plantains. There is a small acreage under papaya, guava, rose apple, star apple, wild mangosteen, jack fruit, custard apple, lime and pomelo. Although a few attempts have been made to grow oranges of both tight and loose jacket types, the district does not offer much prospect for the extension of the acreages under these fruits.

Thanks to the pioneer work of some of the fruit-growing enthusiasts of the Roman Catholic community, a great stimulus has been given to the improvement of the mango industry in the district. Although South Kanara cannot boast of a large area under this fruit, it occupies nevertheless an outstanding position in the Presidency in regard to the improved methods of fruit farming. It was South Kanara which first showed to the Indian Mango growers a most valuable and convenient method of top-working useless mango trees to better varieties by the method of 'insertion' or side-grafting. It was also in South Kanara that the possibility of propagating mango trees by 'gootee' was first demonstrated as a practical method. The enthusiasm of the South Kanara growers has also been responsible for enriching the Indian mango varieties by such notable new varieties like Mundappa, Moolky, No. 1, Moolky No. 2, Taripadi, Porkal, Kadri No. 1, Kadri No. 2, Buntwal Dooma, Adyar Dooma, and a host of other less known varieties.

All these achievements have been of no avail in improving the economic interests of the fruit growers of the district in any considerable measure. The season for South Kanara mangoes is a very short one lasting from April to May. With the emergence of South-West Monsoon, the standing crop of fruits get considerably damaged and the fruit season comes almost to an abrupt end. In the adjoining district of Malabar, the growers have been fortunate in concentrating their attention on the culture of only a limited number of very early varieties like Olour, the fruits of which are in demand almost all over India, and because of their earliness are

also capable of being marketted at remunerative rates, free of competition from other varieties of better quality. It therefore appears that, if only the enthusiasm of the South Kanara growers is harnessed into the production of early varieties of good quality, the industry will stand to profit in a much better degree than at present. A systematic survey of seedling orchards in the district is likely to offer valuable material for the final selection of choice varieties of early bearing tendencies. When once the selections are made and the existing mango trees of inferior kinds are top-worked, the district is bound to achieve its deserved place among the leading mango producing centres of India.

In recent years, the cultivation of sapotas has received a considerable amount of attention in the district. This fruit is of less importance in commercial orchards, because of the lack of demand and of its easily perishable nature. Unless better transportation facilities are provided and distribution methods are improved, there does not appear to be much scope for the expansion of the area under this fruit.

Even though pine-apples can be grown both in Malabar and South Kanara with an equal degree of success, the present area under this fruit being not over 400 acres, there is a great deal of scope for the extension of the area and for exploration of new markets for this fruit. With the development of pineapple canning industry, the prospect for this fruit will undoubtedly become very bright. Kew, Mauritius and Queen varieties are now being grown on a small scale by growers in the district, but there is every reason to believe that the laterite soils of the red ferruginous series occurring all over the hill slopes of the district can advantageously be brought under one or more of these varieties in a considerably larger measure than at present.

There is already a large area under cashew-nuts in the district, but the expansion of the area under this crop is dependant upon the potential demand in consuming areas. It does not appear to be a safe policy to concentrate on the extension of the area under this crop without simultaneously tackling the development of markets.

With a crop like bananas, South Kanara cannot hope to compete with Malabar, although there is room for improvement in cultivation, in order to reduce the cost of production and to be able to supply better and standard quality fruits for local markets.

In regard to other fruits like papaya, rose-apple, star-apple, guava, custard-apple, limes and pomeloes, there is certainly room for extension, provided systematic work is undertaken at the outset to test the most suitable varieties of each of these fruits for the district, and to ascertain the most economic and suitable method of propagation and culture. As in most other parts of India, these fruits have not attained much commercial importance in the district, in spite of the fact that conditions are favourable for their production. There is also a good demand for choice varieties of all these fruits in urban areas.

In comparison with most other districts of the Presidency, South Kanara is able to grow a number of fruits at a relatively less cost, owing to the bounteous rainfall. The District Board and Municipalities can easily stimulate a better production of fruits, by undertaking to plant fruit trees of choice varieties as avenues to the roads and in the compounds of buildings and rest houses. The cost of the maintenance of such trees in South Kanara is bound to be low than the other drier parts of the Presidency, while the indirect advantages of securing an increased quantity of fresh fruit for the consumption of the people of the district are great. Incidentally, the planting of fruit trees in preference to those that are now used as avenue trees, will result in no small increase in the income of these Local Bodies.

Coffee Trade in Mangalore

By

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Geographical factors, to a very great extent, contribute to the importance of a place in regard to trade and industry. The prominence of Mangalore as a Coffee Market, is no less due to these factors, *viz.*, its proximity to rich Coffee-growing areas of Mysore and Coorg and its location on the sea coast. In the year 1936-37 the total exports of coffee through all the ports of the Madras Presidency were 2,05,842 Cwts. of which 1,55,575 Cwts. were through the Mangalore Port alone which constituted about 70 per cent of the total exports through all the ports of the Presidency. The details of the exports for 1936-37 and the exports for the period 1923-24 to 1927-28 through the ports of the West Coast are given in appendices I and II respectively. The importance of Mangalore as a Coffee market may be gauged from these figures.

Coffee industry is one of the leading industries of Mangalore. There are four large coffee curing companies in Mangalore (vide Appendix III). Coffee from plantations mostly from Mysore and Coorg are transported to Mangalore either by bullock carts or Motor Lorries. Generally, the curing companies receive the consignment for curing during the months of September and October and at times up to December. After curing the seeds are sold to exporters in public auctions in lots. The exporters after grading the lots consign them to the various countries. France is the leading importer of Indian Coffee. United Kingdom, Norway, Belgium, Germany and Netherlands are some of the other important importing countries. The exports from Mangalore port continue up to the end of May when it closes for about three months on account of the South-West Monsoons.

What are the factors that have contributed to the importance of Mangalore as a Coffee Market ? Mangalore has no good harbour. The steamers anchor about three miles away from the shore ; and the port remains closed for three months in a year. In spite of these drawbacks, Mangalore continues to be an important trade centre in Coffee.

Before dealing with the causes leading to the importance of Mangalore it may not perhaps be out of place to state in brief the

history of the introduction of Coffee in South India and the growth of the Industry on a commercial scale and also to state in brief the various stages in the development of road and railway communications in Mysore. This is necessary for a proper understanding of the importance of Mangalore as a Coffee market.* The cultivation of coffee is said to have had its origin in the Kadur District on the Eastern Border of South Kanara District. The plant was first introduced in about the 17th century by a Muhammadan Pilgrim named Baba Budan, who on his return from Mecca brought a few berries and planted them on the hills that now bear his name. It was not until 1820 that the cultivation extended beyond the original garden. Twenty years later, one European planter, Mr. Cannon, formed an estate south of Baba Budan Giri. The success of his enterprise attracted other planters and in 1843 another planter by name Green started another plantation south of Manjarabad. Since 1860 several estates sprang up in the districts of Kadur and Hassan on the eastern border of South Kanara district and also in Coorg and Wynad. At present Mysore produces the bulk of the coffee in India.

The construction of the roads connecting various parts of Mysore with ports on the West Coast seems to have closely followed the exploitation of the hill slopes in Mysore by coffee planters. There seems to be no indication that there was any road connecting Mysore and Mangalore before 1831. During 1831-56 several roads were constructed connecting the important towns of Mysore and extending on all sides to the frontiers. It was only subsequent to 1856 that six outlets were provided to the West Coast by the construction of the following six roads (i) Kallurghat Road, (ii) Agumbighat Road, (iii) Manjarabadghat Road, (iv) Bisleghat Road, (v) Bundghat Road, (vi) Haidarghat Road. By these lines the whole Mysore State to the remotest corner is in communication with the West Coast.**

Thus we see that the coffee growing areas of Mysore are on the borders of South Kanara district with only the Western Ghat intervening. But these natural barriers have been overcome by a net-work of roads connecting the important towns of Mysore with the several ports on the West Coast. It may be questioned whether Mangalore has the advantage over other ports in the matter of distance from Coffee-growing centres. Manga-

*Mysore Gazetteer, Vol. V. p. 1081.
**Mysore Gazetteer, Vol. III. p. 322.

lore is about 97 miles distant from Chikmagalur, the chief town of Kadur, 107 miles from Hassan and 84 miles from Mercara while Tellicherry is about 186 miles from Chikmagalur (via Kodlipete, Sakleshpur and Marnad), 182 miles from Hassan and 72 miles from Mercara. Calicut which is further south of Tellicherry should therefore be in a less advantageous position than Tellicherry. Thus we see that Mangalore has decided advantage over Tellicherry and Calicut in regard to distance from Mysore coffee-growing areas. Tellicherry has, however, an advantage over Mangalore in regard to coffee coming from Coorg. In fact the bulk of the coffee produced in Coorg finds its way to the Tellicherry port. Any ports on the east coast should be left out of consideration as they are far removed from coffee-growing areas. Madras is about 382 miles from Hassan by rail (via Mysore and Bangalore).

Last but not least, Mangalore would not have attained the present prominent place among the coffee market but for the good quality of Mysore Coffee. This Mysore Coffee is considered the best in the World with the exception of coffee grown in Jamaica which produces a very small quantity and it is stated that Mysore Coffee fetches the highest price in the London Market. But for its quality Mysore Coffee would not have been so much in demand in the overseas markets. On the other hand, it might have been consumed within the country. In that case, Mysore Coffee would have been diverted to any of the inland countries such as Bellary, Salem, Coimbatore and Madras, as ample communication facilities existed between these places and Mysore by the time the coffee industry gained prominence in Mysore. It may be mentioned in passing that by 1864 Bangalore was connected by Rail to Madras and by 1882 Bangalore-Mysore line was completed.

There is one other factor that has contributed to the importance of Mangalore. Planters get better price for their produce in Mangalore than in any other market on the West Coast. This is due to the fact that in Mangalore there are a number of speculators and exporters with good experience and export connections all over the world. It is not unusual, therefore, for coffee cured at Tellicherry also to find its way to Mangalore Market. Thus we see that the location of Mangalore in relation to the coffee-growing areas has been largely responsible for the importance of Mangalore as a Coffee Market.

APPENDIX I

Statement showing exports of coffee (quantity and value) during the year 1936-37 through ports in the Madras Presidency.

Importing cover lines.		Mangalore.		Tellicherry.		Calicut.		Cochin.		Tuticorin.		Madras.		Dhanuskodi.	
		Quantity Cwts.	Value Rs.	Quantity	Value Rs.	Quantity	Value Rs.	Quantity	Value Rs.	Quantity	Value Rs.	Quantity	Value Rs,	Quantity	Value Rs.
United Kingdom	...	15987	808301	499	18908	13194	757635	735	29550	—	—	—	—	—	—
Babrin Isles	...	911	34003	—	—	—	—	—	—	—	—	—	—	—	—
Ceylon	...	14	701	—	—	4	159	10	442	1	30	—	—	178	7065
Straits Sts.	...	3990	172231	260	9607	1582	58539	228	9579	—	—	—	—	—	—
Canada	...	353	17376	—	—	—	—	—	—	—	—	—	—	—	—
New-Zealand	...	935	39149	—	—	173	6915	—	—	—	—	—	—	—	—
Sweden	...	500	16420	—	—	—	—	—	—	—	—	—	—	—	—
Norway	...	30532	1175599	2698	74322	—	—	600	18000	132	7920	—	—	—	—
Germany	...	6112	134178 + 116657	774	24400	260	15100	50	1500	—	—	—	—	—	—
Netherlands	...	2535	103566	3154	93193	—	—	—	—	—	—	—	—	—	—
Belgium	...	16010	674686	3136	99803	701	30461	150	4500	—	—	—	—	—	—
France	...	67077	2404599	13191	408505	1494	79557	4781	188825	99	5940	—	—	—	—
U. S. A.	...					800	48400	4	165						
Morocco	...	50	2000												
Algeria	...	498	19400	78	2202	—	—	114	3615	—	—	—	—	—	—
Egypt	...	260	8400	1	50	—	—	—	—	—	—	—	—	—	—
Japan	...	140	4580	—	—	—	—	—	—	—	—	—	—		—
Iraq	...	7170	290070	32	642	—	—	309	10972	—	—	—	—		
Arabia	...	31	1500	—	—	59	1469								
Italy	...	2454	126570	465	17975	120	7800	60	2400	—	—	—			—
Total	...	155575	6150886	24288	749706	18408	1006744	7041	269546	240	14065	112	3800	178	7065

APPENDIX II

COFFEE EXPORTS THROUGH THE PORTS OF THE WEST COAST

1923-24 to 1927-28

Ports	1923-24	1924-25	1925-26	1926-27	1927-28
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
Mangalore	137,842	166,167	125,819	105,956	183,602
Tellicherry	47,857	43,176	38,836	28,478	50,772
Calicut	22,315	24,293	29,275	9,884	31,219
Cochin	39		799	101	461

APPENDIX III

1. P. F. X. Suldanha's Highland Coffee Works.
2. A. J. Saldanha & Sons, Boloor Coffee Works.
3. Volkat Bros. Coffee Curing Works.
4. Pierce, Leslie & Co., Coffee Curing Works.

Tile Industry in Mangalore

BY

U. HAMMABBA, M.A.

It is the tile-industry which gives Mangalore a place among the manufacturing centres of this Presidency. In the manufacture of tiles and bricks, the District of South Kanara has practically a monopoly; and the industry is localised in Mangalore. The importance of this industry, the causes of its concentration and the problems of the tile-business will attract the attention of any student.

The importance of this industry lies in the fact that the heavy rainfall in the West Coast of India during the monsoons makes it an impossibility to live in flat terraced houses as in the east coast, and hence houses with sloping tiled roofs are indispensable to the West Coast. Besides, in any scheme of public works programme or the solution of housing problem in this Country, bricks and tiles form important items. With improved and cheap transport, this small town can cater to the needs of an All-India Market. About 50% of the title factories in the Madras Presidency are concentrated in this town. A large amount of capital has been invested in this trade by the local merchants, and it provides on an average, employment for about 3,000 labourers inside the factories. About the same number of coolies are employed outside the factories, in connection with the excavation and transport of clay, the raw material for this industry.

A few words may be said regarding the source, varieties and method of purchase of clay. The strata of clay which vary from 3 to 6 ft. in thickness are generally found one or two feet below the surface of the rice fields in South Kanara. They are dug out and conveyed in native crafts to the factories. There are different varieties of clay which may be classified under four different groups viz., black, red, brown and white, according to their colour and mineral contents. Reddish-brown clay containing more iron ingredients and about 5% of sand is supposed to be the best. The black clay which is too plastic cannot be used without mixing it with other varieties in suitable proportions. White clay is not of great use to the tile industry. Inferior varieties of clay are suited for brick-making. They are also classified according to the place

from which they are brought and have some special qualities. Some of the familiar names given are "Gurpur Clay", "Maravoor Clay", "Ammunjee Clay", "Cannore Clay" and "Arkul Clay".

The method of purchase is very simple. The majority of the manufacturers get the supply on contract basis. There are also cases, where the manufacturers themselves lease the clay fields and excavate the clay and transport it under their own management. But these are exceptions to the rule. The usual price of clay is about 8 to 10 annas per box, whose cubic content is about 20 cubic feet.

As early as 1800 A.D. Sir Thomas Munro, in his observations on the South Kanara District remarked, "Kanara will probably never be a manufacturing country, because it produces none of the raw materials necessary to render it such and because the heavy rains which last so great a part of the year are an insurmountable obstacle to all operations which require to be carried on under clear sky and an open air." Perhaps Sir Thomas Munro never visualised the potentialities of her soil.

It behoves us to examine the permanent, natural and accidental factors which have contributed to the localisation of the tile-industry in Mangalore.

Like all other industries, factors such as availability of raw materials, cheap labour, transport facilities, nearness to the market, availability of capital and a suitable climate coupled with accidental factors, like pioneers to start a new industry, have led to the establishment of the tile industry in Mangalore. Clay, which is an important item in the manufacture of bricks and tiles, is abundant in the District of South Kanara, especially in the suburbs of Mangalore, within a radius of six or seven miles. The river Nethravathi on the bank of which Mangalore is situated affords easy means of communication to the interior. The cost of conveyance of clay from the field to the factory is also cheap. Mangalore draws its cheap labour from the neighbouring villages.

Further, the position of Mangalore on the sea coast makes it possible to reach her markets without much difficulty. To the various cities like Karachi, Bombay and Colombo, tiles are sent in big vessels called "Manjis" and "Pathemars." Markets like South Africa, Persia and Singapore, are provided by steamers either directly or from Bombay. Lorries and bullock-carts carry tiles to Mysore and Coorg. The South India Railway facilitates easy transport to the Southern districts.

The organized development of this industry dates from the establishment of the Basel Mission in Mangalore. They were in fact the pioneers of this industry on modern lines. Their main object in the early stage was to give employment to the native converts to Christianity. It was in the year 1865 that the first tile factory was established at Jeppoo. The credit of introducing machinery for the manufacture of tiles goes to the late Rev. Phlebs, a German Missionary and his two factory assistants, Abraham Settian and his son Micha Settian. Long before the introduction of machinery in this industry old-fashioned tiles used to be made in the District by potters. Those hand-made tiles have now been completely replaced by machine-made tiles which are favoured at once for their cheapness, lightness, size and durability.

The tile industry in South Kanara is well-organised, the principle of division of labour and large scale production are its attendant features. Most of the firms are individual concerns. There are five partnership firms and two joint-stock companies, apart from the "Big Three," namely, the two Basel Mission factories and the "Albuquerque and Sons" tile factory. There are 38 factories on the whole with about 80 presses between them. Except for the crude oil engines which run the pug-mills (which is imported from England) most of the other items of equipment are made locally. The presses and pug-mills are manufactured in the local iron works. Whereas in 1895 there were about 1000 workers with the production of over 7 million tiles to their credit, now this industry has been able to give employment to over 3000 workers who could produce about 600 million tiles per year. Moreover the cost of production of 1000 tiles, which was Rs. 25 in 1895 has come down to Rs. 21 according to my estimate.

In the manufacture of tiles any casual observer will find at least six important stages, which deserve our notice. The various operations may be broadly called the stacking stage, the mixing stage, the pug-milling stage, the pressing stage, the drying stage and the kiln stage or the baking stage.

When clay is brought it is not immediately used for the manufacture, but stacked in high heaps for a year or two. This "stacking" improves the quality of the clay and gives better results in the production of tiles. Large sums of money have to be advanced to the "clay-contractors" for the supply of clay.

In the second stage, the various kinds of clay mentioned above are mixed in a particular proportion in the "Clayshed." The need for this arises from the fact that if tiles are prepared out of one

kind of clay only, they will become either weak or get shrunk or turn pale. Unmixed clay is liable to great shrinkage, hence clay with more sand contents is mixed with it. A certain proportion of clay containing more iron ingredients is mixed with brown clay, in order to give strength to the tiles. The black plastic variety is used in very small proportions, lest the tiles should get white patches and mar the attractive red colour. The superiority of the tiles depend upon its colour, sound and strength. Hence great care is needed at this stage of the process in mixing the various varieties of clay. In some of the big factories the workers are under the strict supervision of a "clay maistree" who is often one of the skilled workers of the factory.

The third stage of the process of manufacture is to put this mixed clay into the pug-mill for grinding it into a smooth plastic substance. The pug-mills are generally worked by crude-oil engines. Only the Basel Mission factories at Mangalore use steam-engines to work them. Recently a few of the manufacturers have installed electric machines, whose initial expenses are very small compared with other types of engines. But as the running expenses are heavy they have not become popular. When the clay comes out of the pug-mill they will be cut into rectangular blocks and carried by the workers to the tile presses.

In the fourth stage, these blocks will be placed on the tile moulds and pressed in quick succession. Two persons will be engaged in working the press-wheel, while a number of persons will be doing small bits of work near the press. One will be found putting the clay in the mould, another removing the pressed tiles, a third smearing the mould with oil, a fourth clipping the superfluous clay attached to the tile, a fifth boring a hole in the tile, and a sixth transferring it to wooden frames, and a number of workers busily engaged in carrying them to the drying-sheds. The specialisation of workers in small processes seems to have reached a fair degree of perfection. In some of the big factories there are moving cranes to carry the tiles to the drying-sheds. Ordinarily each hand-worked press is capable of producing 2500 tiles per day. The Basel Mission tile factories at Mangalore use power-worked presses, which produce treble the number produced by the ordinary presses.

When these fresh tiles reach the drying-shed, they are placed on wooden shelves. They will be allowed to dry for about two to three days. When the tiles get dried, they become very hard and

are ready for being baked in the "kiln." During the rainy season, naturally, it takes a longer time for the tiles to get dried.

In the last stage, viz., the kiln-stage these unbaked tiles are sent to the kiln to be baked. They will be arranged in a particular way and the doors of the kiln will be closed air-tight, before setting fire to the fuel already piled inside the kiln. It takes about 24 hours for the tiles to get properly baked. Then they will be allowed to cool for about a day, after which they will be removed to the store-sheds, ready for marketing.

There are two kinds of kilns, viz., the "ordinary kiln" and the "continuous kiln". The former type is common among the small manufacturers and is capable of baking 2500 tiles at a time. The latter type is adopted by the bigger manufacturers. There is a great economy of fire-wood and time in this kind of kilns and their capacity is also greater. But the construction of these kilns is very costly and would be of great advantage only if the factories work continuously, for, the continuous kilns should not be "starved". The "feeding" and "firing" arrangements of the various chambers in the continuous kilns not only result in great economy of fire-wood and time but also facilitates uniform baking of tiles. The numerous chimneys that tower high in the town of Mangalore puffing out columns of continuous smoke give it an air of modernity and industrialism.

The above description of the various stages of tile production reveals that it is not only a round-about process of manufacture, but is essentially a capitalistic venture. A large fixed and circulating capital is required for the organization of the industry. From some of the information I have collected, I have estimated the total capital invested in this industry to be about Rs. 105 lakhs. Only about 25% of the capital seems to have been borrowed. There is a working capital of about 77 lakhs, largely borrowed from banks, local merchants and Multani money lenders. The interest paid varies from 8 to 10%. There are scarcely any facilities for long term loans. This unduly handicaps the industry and prevents its expansion.

Further, like many other Indian industries, the marketing arrangements of tiles are very defective. The local buyers either directly purchase them from the manufacturers or from the commission agents known as the 'dalals.' There are marketing agents in Bombay, Karachi, Madras, Goa, Colombo, Mysore etc. The big manufacturers have got a fairly elaborate marketing organisation, but the smaller manufacturers have none. They are entirely

dependent on the big bosses of the trade for the marketing of their products. There are also several professional dealers and middlemen who make unfair discrimination in the disposal of various brands of tile and profit at the expense of the helpless manufacturers. It is obvious that an efficient system of marketing is essential. The two most hopeful measures of reform seem to be 'co-operation' and 'regulated markets'.

At present, the tile industry of Mangalore is threatened with destruction. In addition to the lack of proper credit and marketing facilities, the price of tiles has gone down, even below the cost of production. Tiles which were selling at Rs. 40 per thousand are now selling at Rs. 18 and 20 per thousand. This may be attributed to over-production, cut-throat competition and fall in demand. The decline in demand for tiles is mainly due to the growing popularity of substitutes like cement tiles, corrugated and cement sheets, and change of fashion in favour of re-inforced cement terraces and asbestos roofing. The tile manufacturers of Malabar are also capturing some of the markets and are indeed the only rivals. Again, the need for working capital forces some of the manufacturers to borrow short term loans from the banks. When the calls from the bank come, they are forced to sell their tiles at a very low rate, and this in turn brings about a general fall in the price of tiles. If this tendency to force under-selling should continue, the industry is bound to go to the wall. This would result not only in the ruin of the manufacturers and the working class, but will be also a great social loss.

Under such circumstances, especially when we are talking of industrialisation and protection of industries, it is the duty of the State to step in and lend its helping hand. The Provincial Government can, either through the extension of the State Aids to Industries, or through the Co-operative Department, provide long-term credits and thus save the industry from ruin. It is the need for working capital and the unwillingness of the banks to grant long-term credits which have brought about the present unsatisfactory position. It is also an established fact that when they borrow from the Multani moneylenders and rich manufacturers, they have to submit themselves to unconscionable terms like high rates of interest and compulsory sale of tiles to their creditors at much lower rates than market price.

But the manufacturers will do well to remember that self-help is the best help. They should in their own interest organise an Association of Manufacturers, in order to eliminate cut-throat competition and control the supply. This will not only prevent

the industry from being ruined, but will be the first step for a combination of all the factories, with a view to develop the industry on up-to-date lines, and thus to reap all the benefits of a large scale production. Three attempts at price-fixing through Associations of Manufacturers have already failed. Their failures have been mainly due to the fact that only some of the manufacturers were its members, while the majority were outside the Association. It is also said that the Association was solely controlled by one or two tile magnates, while the rest of the members were mere puppets in their hands. Such a sort of Association is opposed to all principles of co-operation, and was bound to fail. If any future Association of the Manufacturers should succeed, it should consist of all the manufacturers and must be on sound principles of co-operative production and sale.

Although the industry is at present in a tottering condition, the condition of labourers is fairly satisfactory thanks to the operation of the Factory Act, which has held in check the various adverse forces of industrialism. The labourers work for 6 days in the week at 9 hours a day, with an interval of half an hour for lunch at midday; labourers are also given rest for 15 minutes both in the morning and evening working hours. The lighting and ventilation of works-rooms are satisfactory. Engines are fenced and injuries are very rare. Compensations for injuries received during the course of employment are promptly given in the event of such mishaps. As far as possible the injured workers would be employed to do some minor operations suitable to them. Women and children employed in the factories form about 24% of the workers. Children are recruited only after being certified by the District Medical Officer, according to the Factory Act. Women workers, especially in the Basel Mission factories are given maternity benefits.

As compared with the other industries in the town, the wages prevailing in the tile industry are deemed to be fairly decent. That is the opinion of the average labourer in South Kanara and no doubt he is justified in his opinion. During my visit to one of the factories, I had a long talk with one of the clay-workers there. He was just like thousands of his kind with a magnificent physique, muscles of iron, and the strength of an ox. Of skilled labour he knew next to nothing, but he was strong and had exceptional powers of endurance. On the river-side were large "Vodas" (Boats) loaded to the brim with black clay. They had sailed down the river from clay-bearing places, and they made a picturesque scene with their huge sails flapping in the breeze

against a back-ground of cloudless blue sky, green river-banks and golden yellow sands. The man was engaged with scores of others in transferring the clay from the boats to the factory-yard. As I hailed him, he stopped, wiped the streaming perspiration from his swarthy brows and approached me. I began cross-examining him. What did he think of the work? How was he paid? Where did he live ? Did he work here throughout the year ? And many more questions of the sort. He told me that he came from a village in the neighbourhood on the opposite bank of the river. He was an agricultural labourer, but he could not get this type of work throughout the year. Every year during these idle months when work was scarce in the village, he would come and work in the tile factory, and thus supplement his meagre income. There was nothing to complain about the wages. So long as one had strong limbs and robust health one could always depend on it. But when health failed, and old age crept in, he could fall back upon his agricultural labour. As for the rest, God was merciful and he would not allow him to starve. After which philosophical observation, he shrugged his shoulders in a gesture of resignation and resumed his work.

A word about the influence of the tile industry in the economy of South Kanara. This influence can hardly be over-estimated and volumes can be written on the subject. Owners of the clay-pits make huge profits by letting out their lands to contractors who act as middlemen. The labourers who are engaged in digging and carrying the clay to the boats; the boat-owners who carry the clay down the rivers to the factory; the full-time factory labourers and skilled workers who are employed in the factory throughout the year; the part-time workers who come from the villages when they are not employed in agricultural activities and thus relieve the pressure on land and agricultural unemployment; the local Iron-foundries which manufacture the presses and the pug-mills; the Railway which makes a big profit from tiles exported outside South Kanara and which can very well afford to lower the rates instead of ungratefully charging prohibitive rates; internal communications; a lot of idle capital which has found a safe investment giving a steady return—on all these factors the tile industry has conferred great benefits. If Mangalore is famous throughout South India as a great manufacturing centre, it is largely due to its tile industry.

As already indicated, the tile industry in Mangalore cannot expect a bright future, unless it is rationalised. As in western countries this industry could be reconstructed on the sound princi-

ples of a horizontal combination. An efficient tile syndicate or merger has to be created. One or two expert technicians should be appointed to conduct research with a view to finding out improved and economic methods of production. They may devote special attention towards finding a solution for meeting the eventual posibility of the best qualities of clay being exhausted. They may also make an attempt at manufacturing light bricks by mixing saw dust with clay as is done in the West. Suitable steps should be taken to encourage demand for "Terra-cotta" products. To combat competition from outside and push through the sales of their products, the Syndicate should organise a department of propaganda. Otherwise, the cement tiles are likely to steal a march over their clay products. If such an efficient Syndicate comes into operation, the problems of getting concessions from the Railway Companies could also be easily solved.

To sum up, here we have an industry rich with possibilities, and with an unlimited scope for expansion. The raw material is there. The capital is there. The enterprising spirit is there. But the spirit of co-operation is absent. Commonsense is very much at a discount. The manufacturers obstinately refuse to face realities. The Government is apathetic, and the industry suffers. A tragic lack of imagination and foresight is responsible for all these ills. Even the present state of the industry is none too promising. But worse will follow in the future. The writer ardently hopes that the manufacturers will see reason before it is too late, and before the entire structure crumbles down. It is not too late even now.

Public Health of Mangalore in Relation to Environment

BY

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Medical science recognises the affinity between the body and the mind. One reacts on the other throughout the human existence. Environment plays on both, the body and mind either for health or ill-health.

Environment may be considered as (1) Physical and (2) human. Under physical, conditions like the geographical and meteorological may be included. Again under geographical, altitude, latitude, nearness to sea, forests, marshy areas, the surface of the country, with hills and valleys and soils come in for consideration. Under human, creations of man such as the location of factories, industries, workshops and such other smoke and noise producing elements may come in for consideration.

I have neither time nor space to discuss all these in detail with respect to their relation to Public Health, but I am content to touch a few in a general way and leave the rest.

Now to start with, I give you an idea of Mangalore from the physical points of view.

This town is situated practically on the same latitude as Madras and is on the west coast of the peninsula situated on the back-waters formed by the convergent mouths of the Netravathi and Gurpur rivers. The town has roughly the shape of a triangle with the apex towards the south. The greatest length, north to south is about 4 miles and the width at the north is about 3 miles. The rivers Netravathi and Gurpur which form the southern and western boundaries of the town are navigable for some distance from their mouths, their combined waters forming a common estuary with a large spit of sand intervening between it and the sea with a nucleus for a good harbour if developed.

The town possesses all the charms of an upland country town being very undulating and practically covered with groves of fruit-bearing trees. The central maidan, the strips of agricultural tracts running north-east to south-west and the Light-House Hill

which is about 240 feet above the sea-level are the main landscape and topographical features of the town. The rivers, the agricultural belts and low hills with valleys between them are the main features of the surrounding country; and the views over the town from adjacent high points are comparable with those generally associated with hill stations.

Whilst the general slope of the town is westward, there are hills and undulations in all directions and the heavy monsoon rain-fall is easily drained off in a very short time and the water is never stagnant.

Soil and Sub-soil.—The soil is generally gravelly and hence porous with sub-soil laterite, except in certain portions where clay soil is met with, in and around the areas that are under wet cultivation. The laterite occurs in the form of a stiff deep red clay often seamed with white and yellow layers; it can be dug out and cut into blocks; when exposed to the atmosphere the stuff, on account of the iron compounds that exist in the composition of rock, becomes hardened into a dark-brown rough rock; it is a very durable building material universally used in the place. The coastal region of South Kanara consists generally of a laterite plateau intersected by numerous river valleys and with granite out-crops showing in places through the laterite.

Climate:—From the meteorological records it is seen that Mangalore enjoys a fairly equable climate. Even during the hottest months of March, April and May, the normal maximum varies between 90° and 92° F., while the minimum varies between 75° and 79°, while in Madras during the hottest months commencing from March to September the normal maximum varies between 90° and 99° and the minimum between 72° and 81°. The cooler months are never cold, the mean temperature of December and January being 79°, standing even higher than Madras temperature which is 76° and 77°. The maximum temperature is not so great nor the minimum temperature so low, as that of Madras, the ranges for these places being respectively 100° to 60° and 113° to 57°.

Rain-fall:—The annual rain-fall averages about 120 inches, the greater part of which falls during the south-west monsoon from May to October; while in Madras it averages 50 inches, the greater part of which falls during the north-east monsoon from October to December.

Humidity:—While the temperature figures by themselves leave the impression of a comparatively pleasant climate in Mangalore,

its relatively higher percentage of humidity makes it rather more oppressive than Madras. The net result is that in Mangalore the climate, though it compares favourably with the temperature of Madras, is oppressive enough in the moisture-laden atmosphere of South Kanara to make life not exhilarating but more burdensome than Madras. The climate is not however unhealthy.

Sub-soil Water:—All round the year, except in high places, sub-soil water in Mangalore is available at depths varying from 20 to 50 feet. The water generally contains some iron composition infused in it from the laterite stratum of sub-soil through which it percolates. Only during the rainy season the water in the wells is cloudy and sometimes of a reddish tint, possibly due to surface percolation mingling with the well water and polluting the same.

Flora:—South Kanara is essentially a forest area, with plenty of cocoanut, arecanut and other fruit-bearing trees. A view of this town from any high point will convince any casual visitor of its rich plant life.

Having said that much about the town itself, I give below the relation of the soils, air and humidity to the health of the place in general.

The soil and its relation to disease:—The Soil was formerly accused of being responsible for many diseases. The list, however, has dwindled with our increase in knowledge. The Soil is mainly associated with (1) wound infections, which are mainly bacterial, (2) hookworms and other animal parasites which have a free-living stage in the soil, (3) infections transmitted by animal vectors which live in the soil, such as rodents etc.

Countless millions of bacteria occur in the upper few inches of the soil. The enormous over-growth of bacteria in the upper layers of the soil gives it the sticky, moist feeling which rich soils possess. Few bacteria are found in an undisturbed soil below a depth of four to six feet. As a rule, living bacteria are not obtained from samples of soil obtained 10 to 12 feet below the surface. Most of the bacteria in the soil are saprophytes. The micro-organisms causing epidemics do not find conditions favourable for growth and multiplication in the soil. The soil is capable of disposing of great quantities of organic matter. However, if it is overburdened it remains polluted and may endanger health through contamination of drinking water and in other ways. It is not only the amount but the kind of pollution, and also the manner of its disposal, that plays an important part. It may be noted that the

purifying action of the soil is largely dependent upon bacteria, and that this action takes place almost solely in the upper layers. Under ordinary conditions pathogenic micro-organisms are caught in the upper layers of the soil, and are detained and destroyed by a combination of physical, chemical and vital processes. Soils polluted with human faeces and urine present the greatest hazard to man. The danger in the case of typhoid, dysentery, cholera and other bacterical infections is usually indirectly through infection of drinking water or occasionally through flies or other mechanical means of transference. A soil polluted with typhoid may endanger either the surface water or the ground water in porous soils, while in some cases cracks and fissures may also act as channels for contamination.

Bacteria in the Air:—Bacteria are widely but unevenly distributed throughout the atmosphere. The numbers diminish as we ascend; some places are quite free. Bacteria are usually attached to other particles. Microscopic organisms do not grow and multiply in the air; in fact, most of them soon dry and die especially when exposed to sunshine. Spores are resistant. For the most part, the bacteria in the air are harmless to man both on account of their kind and number. The dangerous sort come directly or indirectly from man and some of the lower animals. Dust and droplets drifted into the air include bacteria. The number differs greatly with the local conditions. Usually there are more in the open air of towns than in the open country; more indoors than in outside air. Ordinarily, there is little if any danger from air-borne infection except under special circumstances, such as from droplet or dust and close personal contact. The live and virulent micro-organisms found in droplets, though numerically insignificant, have sanitary significance. The viability of pathogenic micro-organisms is a factor in infection carried by droplets.

Effects of warm moist air on the health:—In a hot moist atmosphere an undue amount of blood is brought to the surface of the body, and mental and physical activities reduced. A feeling of depression is felt, and the resulting rise in temperature of the body influences the entire nervous and circulatory systems. There is a disinclination to make a physical or mental effort; in other words, the effect is enervating. A poorly ventilated room in which the air becomes vitiated is usually a warm moist atmosphere, and the ill effects of a vitiated atmosphere are mainly caused by heat and moisture.

Climate and Health:—Climatic conditions affect the health of human beings in several ways; (a) *Directly*—The conditions of air, temperature, moisture and movement taken together may be favourable to the vitality and energy of the body, they may act unfavourably by lowering resistance to disease, or they may actually cause diseases like heat-stroke or frost-bite. Light may act in a favourable or unfavourable manner; excess of heat gives rise to solar dermatitis and night blindness; defect of light is one of the causes of rickets and ostemalacia. Light may increase vitality when it falls on the body in suitable amounts, whereas deficient exposure to light may be a cause of lowered vitality, (b) *Indirectly*—The crops of a place, and hence the food supply of the people depend largely on climate. Insect life is much influenced by climate. Diseases which are conveyed by insects can only be transmitted when the climatic conditions are suitable for the existence of the insects, for the development of the disease parasites in their bodies, and for their ability to bite human beings. Bacteria which have to pass through the air on their way from person to person are also affected by the temperature, moisture and movement of the air so that climatic conditions may greatly influence the spread of 'droplet' infections, and even in some cases the spread of contact infections. Recently much attention has been devoted to note the influence of climate in connection with the prevelence of diseases like Malaria, Plague, Relapsing fever, Small-pox, Cholera, etc.

Since we live in the tropics it may be of interest to note the effects of tropical climate on the human body. There is a general impression that any sensation of cold ought to be avoided; the origin of this notion is that many fevers start with a feeling of chillness and so it is natural for people to think that chill has been the actual cause for these fevers, whereas it has merely been a symptom of the onset. The dread of the slightest sensation of cold on the surface of the body is responsible for a vast amount of ill-health; it leads to the closing up of doors and windows, and so conduces to the spread of the droplet infection; it also causes people to huddle themselves so that they lose the power of reacting to fall in air, temperature and therefore become liable to suffer ill-effects from slight exposure to cold. The body ought to be capable of resisting changes of temperature; it cannot attain full vigour unless exposed to these changes within reasonable limits. In very hot weather especially when the high air temperature is accompanied by excessive air moisture and lack of movement of the air, the body has to contend against a set of unfavourable conditions; the cooling effect of the air, combined with evaporation from the

body surface, may be just sufficient to keep the temperature within normal limits, even when the muscles are relaxed and all the other tissues are inactive. In such conditions exercise is almost impossible, as bodily work is always accompanied by a great increase in heat production; the appetite is feeble because assimilation of food causes increased heat production; the body has no opportunity of reacting to cold and hence loses the power of doing so. Persons exposed for long periods to these conditions tend to become enfeebled and lose their resistance to disease. Their mental energy is also sapped.

Sun-light as a Factor in causing health and disease:—The rays of the sun have very different properties according to their wavelength. In the tropics all the rays of the sun tend to be more powerful than in cool climates. The harm done by the rays of the tropical sun consists in their powerful heating effect on the body, so that when a person is exposed to trying atmospheric conditions the direct heating action of the sun's rays adds greatly to his discomfort and also to the risk of heat-stroke. The wearing of a broad-brimmed pith helmet in bright sun-light is a highly rational procedure as it protects against heat and glare.

Now we proceed to see some of the other local factors which affect the health of this town.

Housing:—Housing has an intimate relation to health. Housing influences morbidity and mortality, but in a rather indirect way. It is difficult to separate the factors of crowding, personal habits, poverty, food and other hygienic and sanitary influences from the actual housing conditions. A house after all is only an instrument that may be abused; thus a good house may be crowded and insanitary, while a poor house may be clean and fairly adequate. Good housing conditions facilitate an adequate supply of fresh air and sun-shine, promote cleanliness and dryness, and favour sanitary isolation; good housing also encourages higher standards of living, and thus favours better personal hygiene and improved sanitation of the environment. Housing conditions may be taken as an index of the general sanitary condition and hygienic habits of the occupants.

Judging by these, Mangalore possesses fairly good dwelling houses to a great extent except in some of the congested and poorer localities. Tiles being cheap, many of the houses, even of the poorer classes, are covered with these, which add to their cleanliness and appearance. The town is slowly extending in an organised way

under some of the town-planning schemes now in force. These schemes provide proper lay-outs with sufficiently broad streets and open spaces which are necessary for the convenience of the public.

Next while considering the environs of a town we should not forget the position of slums and congested areas in it. For, generally these slums and congested areas are counted as the black spots from the sanitary point of view. In these localities the want of adequate space and other sanitary amenities predisposes the inhabitants to various diseases. Poverty is another factor in the case of slums which leads to malnutrition and a train of ill-defined diseases. Fortunately for Mangalore, there are few places of the above type for serious consideration. The central portions of any town are generally congested and we find the same in Mangalore. But most of it is occupied by business-places and go-downs. The Municipality is trying to prevent the formation of slums by opening up new areas under town-planning schemes and by acquiring and re-modelling the existing slums. One such slum, the Guliga Hithlu, has been recently acquired at a cost of about Rs. 50,000 and is now being converted into an ornamental piece for Mangalore under the town-planning schemes.

Public open spaces, recreation grounds and parks.—The whole town is practically a land of gardens. It possesses all the amenities of a garden city of Europe or the ideal country town of India. The rivers Netravathy and Gurpur on the south and the west, the hills and valleys on the north-east, the Court Hill and the maidan in the centre, the old avenues of Pentlandpetah and the agricultural belts, add to the glorious natural beauty of the town. Indeed the whole area entirely resembles Malabar towns; it is very beautiful and rich. The beauty of the river frontage is partly or wholly marred by the occupation on its bank of tile and other factories and the Port. The public recreation spaces available are the central maidan, the Urva maidan and also the reclaimed river portion near the Port. The former is the most resorted to, as it lies in the very heart of the town. It is surrounded on all sides by broad avenue roads.

The Urva maidan is within easy reach of the people living in the Kodialbail wards being at the northern end of the town. The maidan is best suited for recreation fields. The river-side area which is close to the Municipal Office is within the reach of the people residing in the Central portions of the town. In the evening people resort to it for fresh air; but there is not sufficient space for recreation.

The chief beauty spot in the town is the Court Hill. To this hill people resort for open air. The roads leading to the hill are carefully laid. The view from the hill, of the town, the back water etc., is exquisite, the buildings being largely hidden under the thick green foliage of trees. There are no public parks in the town worth the name.

Drainage and Water Supply:—Though this town has certain advantages with its natural elevations and slopes for working out a proper drainage system, till now no attempts have been made seriously to provide a proper scheme for the town. The sullage collections and the stagnant rain water in some of the deep tortuous channels form good breeding grounds for mosquitoes. The mosquito nuisance is more felt in some of the congested and central wards of the town. Attempts are being made to kerosinise the breeding places to minimise the nuisance.

Water supply:—Though this town has a heavy rainfall, much of it is drained off into the sea without any benefit to the town. Wells are generally very deep and some of them get dried up in the summer months. So there is a real scarcity of drinking water for the town. Moreover many of these wells, are getting contaminated especially in the rainy season owing to the porousness of the soil. On account of this contamination, typhoid which is mainly a water-borne disease is becoming an endemic one in this town. Hence, there is an urgent need for a good protected water-supply for the growing needs of the town.

General Conservancy:—The town in general presents a cleaner and healthier appearance than some of the other towns in the Presidency. There is not much of that indiscriminate defecation in the road-margins. The heavy monsoon helps us in giving a thorough wash to the whole town once a year. The Municipality is also alive to its duty and is doing its bit in providing sufficient staff for good conservancy work.

Communicable diseases:—Fortunately this town is not so much visited by epidemics like cholera, small-pox, plague etc. Though the malarious portions of the district are within 20 to 30 miles from Mangalore and there are communications between the Ghats and the town, we do not find Malaria as an endemic in the town. However there are stray cases of imported Malaria. But as has been mentioned already there is enough mosquito nuisance of the culex variety, which is trying to start elephantiasis as a disease for consideration in some of the congested and ill-drained wards of the town. Also there are a few species of Stygomia mosquitoes in the town

which are counted as the carriers of Yellow Fever. But fortunately till the Port is developed and till definite and direct communications with the infected ports of Africa are connected up, there is no danger of Yellow Fever. However, these Yellow Fever carriers have to be counted upon, and measures taken to put them down.

Typhoid has been going on as an endemic disease in this town. Probably the porousness of the soil and the heavy rains seem to give a wide-spread distribution of this disease in this town. Also the factor of human carriers in the causation and the spread of this disease has to be noted in formulating the preventive measures. This disease can only be properly controlled when there is a protected water-supply for the needs of the town. The death-rate under this disease being 2 mille while in the neighbouring Municipalities of Malabar, it varies from 0.3 to 1.5 (1936).

Tuberculosis is another disease which is coming into prominence by its incidence and by the propaganda made against it. The mortality under this disease seems to be somewhere between 2 to 3 per mille of population, the Presidency rate being 2. (1936). All communities seem to be equally affected by this disease. The humid and warm temperature of the town which is amongst the predisposing causes of many respiratory diseases also seems to play its part for the incidence and spread of tuberculosis in the town. Some of the preventive steps are well-known and need no mention here.

Nuisances:—Under this head, I mean the nuisances from dust, noise etc.

Dust:—Dust is not only a nuisance, but under certain conditions is known to be prejudicial to health. It is considered to be a fruitful source of disease. Dust is in reality a normal and important constituent of the air; it exists everywhere in the atmosphere and profoundly affects some of the physical conditions of our environment. One of the most important functions of dust is to limit the humidity of the air by causing the precipitation of moisture in the form of rain, and to help the control of temperature by the formation of clouds, mists and fogs. Dust disperses the light and decreases the transparency of the atmosphere, especially if it be humid. Organic dust exists only in the lower strata, while inorganic particles are found in the air everywhere. "Normal" atmospheric dust, free from bacteria, causes no appreciable irritation to the healthy respiratory mucous membrane. Dust becomes injurious when excessive in amount or when irritating in character, or when it contains injurious micro-organisms; the injury also de-

pends upon the constancy of its presence and somewhat upon the susceptibility of the individual. Dust may act indirectly as a predisposing cause of many infections as well as directly irritating and inflaming the respiratory passages. Dust has an important place in the consideration of industrial hygiene. House dust is more harmful than outside dust, not only because there is more of it, especially in badly ventilated and ill-kept rooms, but because it is more apt to contain damaging micro-organisms. Street dust may contain pathogenic organisms, such as the tubercle bacillus, many varieties of cocci, the colon bacillus, etc. But fortunately the powerful influence of the tropical sun and the heavy down-pour of the monsoon have their affect in minimising this nuisance for the town. The Municipality also is doing its bit in minimising the nuisance by asphalting the important traffic roads of the town for a length of about 10 miles.

Noise:—Noise is a nuisance and when one is exposed to it continuously it may produce impairment of hearing. It is an increasing menace in many towns now-a-days. It has also a harmful effect upon the nervous system and loss of efficiency of workers, thinkers and children, and interferes with sound refreshing sleep. Street noises are more annoying than industrial noises because they are non-rhyphmical. Suitable by-laws are needed to control this nuisance.

Beggars:—Beggars may be counted under nuisances in towns. Beggars are increasing every day in every town. Some of them seem to take to begging as a profession and even developed it into an art. The credulous and sympathetic minds are the victims to the snares of these beggars. Apart from their being a burden and a drag on the society, they are the disseminators of dirt and disease in the public. How many lepers in all stages of the disease, and how many other beggars with various diseases do we see every day along the roads? From a public health point of view early legislation is needed to control the movement and thus prevent the dissemination of various diseases in the public, through this source.

Now after mentioning all these, it has to be stated that for real public health, we have to depend upon the intelligent co-operation of every citizen more than anything else. He should have proper education and understanding to discriminate what is best for him and for his neighbour.

I acknowledge the help I had from the following references (i) Civic Survey Report of Mangalore Municipality (ii) Preventive Medicine and Hygiene by Rosenau (iii) Tropical Theuraputics by Col. Chopra (iv) and Official Public Health Reports for Mangalore,

Communities of South Kanara

BY

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At first South Kanara was a poorly inhabited region of forest land; and later on people came to it from the north and the east. Malekudias, Kudbis and Koragas are the aboriginal people; and they live mostly in the forest and woodland regions. Malekudias live a wild life in the forests and do not even come to the civilized parts. The Tulu speaking people came later on from the east and the south-east and this might have taken place some two or three thousand years ago. Tulu is a Dravidian language which is as old as Tamil or Kannada. It has got a script of its own and the letters are similar to those of Malayalam and Tamil. But now it is out of use. The name of the district suggests that it is a land of Kannada people. But eighty per cent of the people speak Tulu. It is, therefore, really a *Tulunad*. Kannada influence is only of later times.

Bunts and *Billavas* are the two major non-Brahmin communities of this district, both numerous, the former about 150 thousand and the latter about 180 thousand. *Bunts* are mostly landlords. There is much of organization among them and they are therefore in a position to capture several of the seats in the local boards and legislature. Education is rapidly spreading among them: and the educated youngsters are trying to get employed in all departments of Government Service. It is a thriving community following the *aliya santanacattu* i.e., a custom according to which only the females are to inherit the properties, a custom similar to that of *Marumakathayacattu* in Malabar. The surnames used by this community to suffix their names are Shetty, Hegde, Rai, Alva, Punia. Marla, Naik, Bhandari etc.

Billavas are the original warrior community of this district. The deeds of the heroes of this community are still sung as ballads in almost all the non-Brahmin households of the villages. But it is a backward community following the *Aliya-santanacattu*. They have taken up the profession of tapping toddy from palm trees.

The majority, however, are tilling the land, being mostly tenants of Bunts and Brahmins. They have not organized themselves; and therefore, in spite of their huge number in this district, they go

unrepresented and uncared for. At certain places they are called *poojaris* meaning those who have taken up the profession of priests. In Tulu they are known as Baidenakulu and the Bunts as Okkelakulu.

Malayali Billava is a community found in Kasaragod Taluk. They are about 30 thousand strong and speak Malayalam. These and the South Kanara Billavas are to some extent the same type of people.

The *Dravid-Brahmins* are about 55 thousand in number. They must have lived along with the non-Brahmins for ages with perfect concord. Even now within them there is an inner feeling of love and sympathy towards each other, which is not quite the case between non-Brahmins and the other Brahmin communities of the District.

There are many sects among Dravid Brahmins. *Kota, Shivalli* and *Havik* are the main ones. All these have their own *Mutts* and *Swamis*. *Kota Brahmins* formerly belonging to the village of Kota are mostly *smarthas* and their mother-tongue is Kannada. Some of the surnames characteristic of them are: Handle, Hebbar, Holla, Karanth, Mayya, Upadya. *Shivalli Brahmins*, formerly belonging to the village of Shivalli, speak Tulu and are supposed to be the most cultured among the Dravid Brahmins. Among them there are *Smarthas* as well as *Vaishnavas*. The surname characteristic of them are: Acharya, Udupa, Madysta. *Rao* and *Bhat* are used as surnames by all the Brahmin communities. Some of the surnames used by the Dravid Brahmins in Puttur taluk look very strange; as for instance, Tolpaditaya, Yerkaditaya, Kakilaya, Kedilaya, Kodenchitaya etc. *Haviks* are less cultured and of a lower status among Dravid-Brahmins.

There is another sect of Dravid-Brahmins known as *Koteshwara Brahmins*, originally from the village of Koteshwara. Formerly they never used to put on *Mudraharana*. But now they do it.

Among the Udipi Dravid-Brahmins, there are two sects: *Grahastas* and *Mattis*. *Mattis* were supposed to be converts from fishermen. The famous Madhvacharya was said to have converted many of the fishermen into Brahmins when he was not able to get sufficient number of Brahmins for the performance of holy rites.

There are some Kannada-speaking non-Brahmin communities in this district. They follow *Makkalacattu*, i.e., the sons are to

inherit the properties of the father. *Shervegar* or commonly known as *Sheregar* is a pretty big non-Brahmin community of this type in Coondapoor Taluk. Most of them are farmers and uneducated people. A corresponding community in Kasaragod taluk is the *Kota Kshatriya* community. They are few in number but educationally somewhat advanced. *Gowdas* of Puttur taluk also speak Kannada. Educationally they are backward and most of them are farmers.

Mogavirs, Mukkas, Karvis and *Bovis* are the people who have taken up fishing as their occupation. *Mogavirs* are found mostly in Mangalore and Udipi taluks. They speak Tulu. *Mukkas* of Kasaragod Taluk are very backward; and they speak Malayalam. *Karvis* of Coondapoor taluk speak Konkni. *Bovis* might have been originally palanquin-bearers, as the name suggests. All these people are physically strong, but uncultured and educationally very backward.

Weaving might have had very little encouragement in former days. There is one community following this occuption, known as *Jedas* or *Talyas* and these are looked upon with contempt. Among the potters there are two sects. The *Tulu Kumbars* and the *Kannada Kumbars*. In Tulu they are know as *Odaris*. Tulu *Kumbars* are fairly large in number and are proverbially dull. *Kannada Kumbars* are few. They wear the sacred thread and pose themselves superior to the other Non-Brahmin communities.

Among the barbers there are three well-known sects: *Mallyas, Kelasis* and *Muddelas*. *Mallyas* wear the sacred thread. They speak Konkani. They are very few; and they stick to their profession. *Kelasis* speak Tulu. They are a proud set of people who would not stoop to shave people of lower communities. Educationally they are very backward, and so also are the *Muddelas*. In society barbers have got a very low place. People will shun them except perhaps in a saloon. In villages, however, they have got a place of honour. For marriages, deaths, births etc., among the major Non-Brahmin communities these people are given the place of a Brahmin. They are to sanctify the polluted place and perform certain holy rites. This is a very strange thing.

Ganigas and *Somakshatrya Ganiga Shettys* are oil-mongers. They are few and very backward in education. The piper communities such as *Devadigas* of Coondapoor taluk and *Milis* of Mangalore taluk are living mostly in the temple premises. So also are the people of the *Mālai* community (the dancing girls' commu-

nity). But now the custom of girls dancing before the temple gods is gone and these people have taken to other professions.

Acharis, Sonegars and *Harishets* usually known as *Bungarshets* are mostly goldsmiths, ironsmiths and carpenters. *Vaneas* of Coondapoor taluk are a similar type of people as the *Harishets. Vaneas, Sonegars* and *Harishets* skenk konkani while the *Acharis* speak Tulu. All these people wear the sacred thread and style themselves as *Daivajna Brahmins.*

The dobis or washermen of the place are called as *Madivalas.* A large number of Catholics in Mangalore have taken up this profession.

Among the depressed classes we find some devil-dancing communities. Hero-worship is found in almost all countries; but it takes different colours at different places. The heroes of old are worshipped as gods in many places. Here these heroes go under the name of *Bhootas.* The stories of the heroes of olden times are being sung in Tulu throughout the land. These form the folk lore of the people and are known as *Pardanas.* The farmers' children driving the cattle home will sing and act these songs. The men ploughing in the fields and the women transplanting the paddy plants will sing these *Pardanas* in chorus. Only those who are educated in the new style think of them as too low though many generations of blood run in those songs.

Devil dancing is found mostly in the Tulu and Malayalam speaking areas. In Kasaragod taluk *Bunna, Maler* and *Kupla* are the communities taking up this profession. In the Tulu-speaking parts, *Paravas, Pumbadas* and *Nalikedayas* belong to this profession. They get a sufficiently good remuneration for their dancing. At spare times most of them take up the work of making baskets, screens and umbrellas out of creepers, bamboos and palmyra leaves. At certain periods of the year some of them go begging with their dancing and songs. But what little they earn, they spend on drinking.

Among the Adidravidas there are many sects. *Koragas* live mostly in forest and woodland regions. They hunt wild animals and mostly live upon their flesh. They collect bones and sell them to the coffee planters as manure. They are also good at making baskets and screens from creepers and bamboo. *Manyas* or *Holeyas* are mostly labourers. They will be working under big landlords like slaves. In these days most of them go to coffee and rubber plantations as coolies. *Kusalus* of Coondapoor Taluk are

the same type of people as the *Holeyas*. *Thotis* mostly do the work of scavenging. Adi-Dravidas taken as a whole are about 55 thousand in the district. Lack of education and the evil of drinking have made them sink very low in the scale of life.

Saraswats and *Gowda-Saraswats* have come to this place from Goa. In the beginning of the 16th century Goa was taken by the Portuguese; and when there was the Inquisition set up, some of the Hindu communities had to run away from that place. *Saraswats* and *Gowda-Saraswats* of this place are some of these. *Saraswats* are very few in this district about 4 thousand, whereas *Gowda-Saraswats* generally known as *Konkanis* or *Dorakes* are about 50 thousand. A high percentage of the *Saraswats* are educated, both men and women. Many of them are in the Government Services. However their number in South Kanara is gradually decreasing. This is perhaps due to their migrating to different parts of India to get employment.

Gowda-Saraswat is the merchant community of this district. It is a well-to-do community; and even in education they are now much advanced. Many of them are in the I.C.S.

Among the Non-Hindu communities the Catholics are well-off here. They are about 90 thousand, almost all cultured and well-educated. Their advancement here is all due to the efforts of the missionaries. Originally they came from Goa, of course, much later than the Saraswats. It might be one or two hundred years ago. They were converts mostly from the Gowda-saraswat community; and some of them still retain their old surnames like Kamath, Shenoi, Shanbhogue, Pai, etc. The Protestants of this place were all converts from the lower Hindu communities. They are physically and morally a much weaker set of people. Muslims are few in number. Among them the *Moplas* are very backward, Many of the Muslims are petty merchants trading mostly in fish. A few *Jains* are also found here and there, especially at Karkal and Mudabidri. These people are all converts from Bunts.

In spite of the numerous communities, communal difference is not felt much in this district. Education is rapidly spreading among the people and even the little of this difference is gradually dying off.

News and Notes

This issue of the Journal is practically a Conference number, containing the Proceedings, the Presidential Address and most of the papers contributed for the *Eighth Geographical Conference* of the Association, held at Mangalore in May last. This symposium completes at one end the study of the farthest corner of a contiguous area of seven districts so far carried out by the Association. Tinnevelly remains untouched at another end; and Anantapur has been done as an isolated region.

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A meeting of the Association was held on 23-7-1938 at the University Department of Geography under the Chairmanship of *Mr. K. C. Ramakrishnan,* M.A., when *Mr. K. Ramamurthy,* B.A. Hons., Dip. Geog., read a paper on *the Trade of the Madras Port,* which will be published in the next issue of the Journal.

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Dr. Arthur Geddes of the Geography Department of the University of Edinburgh, son of the late Patrick Geddes so well-known in India and particularly in Madras, has been making a study tour in India. He is expected to stay in the country long enough for him to take his part and make his contribution for the Geography and Geodesy Section of the 26th Session of the Indian Science Congress to be held at Lahore in January 1939.

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During his recent stay in Madras, he took the opportunity to visit Tirukkalikunram, Mahabalipuram, Tiruvellore and some villages in the neighbourhood of Madras. He also delivered two lectures—one at the Teachers' College, Saidapet on *Regional Personality with special reference to India* with Mr. N. Subrahmanyam in the chair, and the other at the Meston Training College, Royapettah, under the auspices of the Association with Miss E. D. Birdseye in the chair on *the Dynamic Problems of Indian Geography.*

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The existing Department of Geography in the University of Madras having been recently reconstituted as a Department of Study and Research, Mr. George Kuriyan, the Head of the Department has been confirmed. It is hoped and trusted that Mr. B. M. Thirunaranan, who has been doing hard and steady work in it ever since the Department was started, though on a part-time basis, will be absorbed as a permanent member of the staff.

In the course of a year and odd two Lecturerships in Geography in the two Government Training Colleges in this Presidency will be falling vacant. No doubt such vacancies used to be filled up formerly by appointing persons who were known to have had special knowledge of and interest in the subject and experience in handling it in Training and High Schools. Now that technically qualified people are forthcoming and available, we have no doubt that the Authorities will, in the interests of efficiency of a subject which has still to make good lee-way in this land, appoint the best qualified persons, irrespective of other extraneous considerations.

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While the Madras University has done its bit for Geography by passing Regulations for including the subject in the Intermediate and B.A. courses (though colleges have not taken advantage of it to provide for its teaching) and by having a University Department of Study and Research instituted, where the Diploma Course is conducted, the other four Universities of South India do not as yet seem to have taken any steps in the right direction regarding the introduction of this important subject. Andhra has it in the *Intermediate Regulations only;* Travancore *intends* to have a Diploma; Mysore *promises* to start it in the Intermediate Course; while, Annamalai is contemplating. Hyderabad (Deccan) does not seem to have thought of it at all.

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Meantime, Northern Indian Universities that took up the question of Geography long after it was first mooted by Dr. Gilbert Slater in the Senate of the Madras University in 1920, have stolen several marches over the South; and one University after another has constituted Departments and Degrees in Geography. It is time that " benighted " South India wakes up in this matter.

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The truncated High School Scheme of Geography is having its merry course. The A-Group Geography (mated with History on the basis of 4:6) with an hour's paper for it after a three year's course, is merely Regional Geography of the World which does not get its counter-part and complement in General Geography, as the C-Group Geography (being a blind alley) is practically non-existent. The Matriculation syllabus in Geography, which is merely copied from the S.S.L.C. Course, requires, therefore, to be revised from this point of view.

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The Scheme and Syllabus in Geography for European schools are being revised; and it is expected that a more balanced and purposeful syllabus will be brought into being with Regional and General World Geography in proper proportion.

By the way, a Summer School in Geography for the benefit of teachers in European schools has been asked for here and there; and if there is a real demand for it, this is just the time to organise it, as a revised syllabus for them is on the anvil. Its introduction can with advantage synchronise with a Refresher Course that can pave the way for it. Such a course can best be organised on a hill station like Kotagiri or Kodaikanal, or even at Bangalore.

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But the more immediate problem now with regard to the teaching of Geography in this Presidency is that of the medium of instruction in High Schools. Pupils are quite competent to follow Geography taught in the mother-tongue in the middle school; and no difficulty arises in the matter of getting correct equivalents for technical terms at that stage; but the moment they enter the IVth form all these difficulties crop up—difficulties on the part of the teacher rather than on the part of the pupils. Now that the teaching in non-language subjects has to be done in the mother-tongue under the new dispensation, the general experience even in this short period has been that boys understood the subject better through that medium, and more boys did so. It is a pity that this advantage cannot be shared by certain schools, due to the disadvantage of their being situated in bi-lingual and multi-lingual areas. But that is part of a larger question.

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The Departmental Syllabus for Forms I to III with its definite suggestions and instructions has produced a rich crop of text-books of all kinds. But what really matters more is the actual teaching in the class-room—how far those instructions are carried out, regarding practical work (including observational work). Our information, so far as our limited enquiry goes, is that the teaching has once more become bookish, that the printed letter is the fetish; and teachers frankly say that observational and practical work are not practicable on account of the over-crowded classes and the over-loaded curriculum. If that is a fact, the problem has to be tackled again, and a permanent solution reached.

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But, outside the School and the College, in everyday life itself, the Radio, Rural Reconstruction, Famine trouble and flood havoc, Everest Expedition and tourist industry, Spain, China and Central Europe, and heaps of other similar topics are cropping up all affording plenty of interesting material for not only the politician and the statesman, but also for the ordinary citizen to understand and appreciate with the right geographic outlook. It is for the schools to provide the proper outlook and prepare for the right vision.

Reviews

Physical Geography for Indian Students. By Cyril S. Fox, (Macmillan & Co., Ltd., London). Price 7sh. 6d.

"The Rudiments of Physical Geography for Indian Schools" by H. F. Blanford, written nearly 60 years ago, though still charming and valuable, required to be re-written and brought up-to-date in view of the great advance in knowledge that has been made in these two generations. Mr. Cyril S. Fox of the Geological Survey of India, the author of the volume under review, as a matter of fact intended doing so ; but circumstances led him to perform that service for another classic of Physical Geography, that of Simmons & Stenhouse, which has been popular with a former generation of students. In revising and enlarging it, Mr. Fox has kept in view the needs of the Indian student, and has re-written the volume from the Indian point of view, bringing to bear on it his Indian experience, including in it facts, examples and illustrations referring to India. Especially note-worthy are the portions dealing with maps, which are illustrated with some typical maps of the Survey of India, geological portions in which the author has had the assistance of some of his colleagues, and the meteorological section wherein new maps and new facts and theories have been added. In numerous other places too, all the latest knowledge has been laid under contribution, as in treating of the Indian Ocean, Earthquakes in India, Upper Air Data and Researches etc. In short, this valuable publication fills a gap ; and we have no hesitation in recommending it for general use by University students as well as teachers of Geography in this country.

Principles of General Geography. By Dewan Bahadur H. L. Kaji. (Oxford University Press). Price 5sh.

It is pleasing to note that standard books on Geography, written from the Indian point of view, are being increasingly produced. This volume on the Principles of General Geography has been written by an expert, who is well conversant with Indian conditions and with the special needs of Indian students. In the earlier chapters, the author deals with facts and principles that go to make up the environment of Man, namely, the Earth its surface, climate, vegetation and animals, and the division of the Earth into natural regions. In the later chapters, he deals with environmental control on Man ; the development of human life, and the progress and

the problems of countries. The volume, which is a little too advanced for the High School, may be used as a reference book at that stage ; but, it is suitable for introductory study by undergraduates of the University. The pupil-teachers in Secondary Training Schools will find it specially valuable in giving them a proper grounding in the general principles of World Geography.

A General Geography for Schools. By W. S. Batho. (George G. Harrap & Co., Ltd., London). Price 3sh. 6d.

This book contains suitable and sufficient material for a two-year course—the world being covered twice in outline. The first half of it, which deals with the physical aspect in the chapters dealing with relief, climate, natural regions etc., may be covered in one; while the latter half, dealing with the human side can be gone through in the second year. An interesting feature of the volume is the great emphasis on current events of the world recorded by the nespaper etc., as an important source of general knowledge; and the treatment of geography as a living subject, needing close correlation between the physical and human sides of its study. The presentation is clear, simple and interesting; and the volume is illustrated copiously with suitable pictures, maps and diagrams.

Prepared by the author for use in those English schools where it is not possible to devote sufficient time for the study of the world on a regional basis, this volume can be used with advantage as a text-book in European schools in India as well as in other schools, where a fairly full knowledge of the general geography of the world is required.

Modern Geography of India, Burma and Ceylon. By Kazi Saieduddin Ahmed. (Urdu.) (Rai Saheb Munshi Gulab Singh & Sons, Lahore).

This book has been prepared in response to the new demand for teaching the non-language subjects in the mother-tongue; and the author has taken great pains in bringing together a good deal of detailed material about the Geography of this country. The first half of the book deals with the general geography of India in a systematic way in 12 chapters under the following heads:—Position, extent, relief, drainage, climate, natural vegetation, population, irrigation, agriculture, minerals, industries, natural regions and political divisions. The latter half deals with the detailed geography of the Provinces and States as well as of Burma and

Ceylon. The language is simple and the presentation clear; and where technical terms or proper names are concerned, their English equivalents are given within brackets. A colour physical map of India and a large number of sketch-maps illustrate the volume, which, however, does not contain any pictorial illustrations.

While giving due praise for this pioneering attempt at production of a Geography of the Mother-Country in the Mother-Tongue, which is full and well-written, we have to offer a few suggestions for improvement, which may be carried out in the next edition. For one thing, the book which is almost encyclopaedic with too many facts and names will have to be relieved of a number of them to give the right perspective; and a better regional synthesis and correlation would improve the treatment of the several Provinces and States. Wrong spelling of certain English words in brackets and certain loose and inaccurate statements require to be corrected. In spite of these small defects, the volume merits being used as a text-book in High Schools, where Urdu is the medium of instruction.

Man's Life on Earth: Book I for Form I. By Helen T. Scudder. (Oxford University Press: Indian Branch). Price annas 12.

This is the first of a series, written by a competent and qualified teacher of Geography, for pupils of Form I in accordance with the syllabus issued by the Madras Educational Department. The descriptive method has been followed, the physical and the human facts being causally correlated in an interesting manner. The book has been devised for individual method also: and the pupils are advised to study the lessons for themselves under the guidance of of their teachers, thereby growing self-reliant. Team-work is also suggested. The language is simple; and the volume is copiously illustrated with pictures, sketch-maps and diagrams. Practical exercises at the end of each chapter serve to test the work done and to suggest follow-up activity on the facts learnt.

Geography: Books I to III for Forms I to III. By C. Raghunathan. (G. Srinivasachari & Sons, Madras). Price As. 10, As. 12, As. 12.

This is a series of middle school text-books, prepared on the lines suggested in the recent syllabus of the Madras Educational Department. Of the several alternative treatments suggested in it,

a note of originality has been struck by following the last one: namely,

Form I—India, Australia and Africa;
Form II—North and South America.
Form III—Eurasia.

As per instructions given in the Departmental Scheme and syllabus the descriptive treatment has been followed in the earlier book and the influence of environment on human activities brought out. Questions and exercises at the end of each chapter, sketch-maps, diagrams etc., and a neat get-up are other features of the series.

Books and Journals Received

Physical Geography for Indian Students. By Cyril S. Fox.
Principles of General Geography. By H. L. Kaji.
Man's Life on Earth. Book I for Form I (Tamil and Telugu). By Helen T. Scudder.
A General Geography for Schools. By W. S. Batho.
Modern Geography of India, Burma and Ceylon (Urdu). By Kazi Saieduddin Ahmed.
Geography. Books I, II & III (Tamil). By C. Raghunathan.
Descriptive Geography. Book II (Tamil). By N. Subrahmanyam.
Records of the Mysore Geological Department. Vol. XXXVI—1937
The Himalayan Journal. Vol. X—1938.
Kalaimagal: June, July, August & September 1938.
Geography: June 1938.
Indian Culture: April and July 1938.
Educational India: May, June, July, August & September 1938.
International Review of the Hungarian Geographical Society: Vol. LXVI—N. 1-5.1938.
Journal of Indian History: April 1938.
The Geographical Journal: June, July and August 1938.
Akademiya Navk: U.S.S.R. *Trudi Instituta Geografi:* Bk. XXIX—1938.
The South Indian Teacher: June & July 1938.
The Indian Educator: June, July and August 1938
The Geographical Magazine: July, August and September 1938.
The Educational Review: June, July and August 1938.
Problems of Physical Geography: *Akademiya Navk*—U.S.S.R.: Bks. V & VI—1938.
Quarterly Journal of the Mythic Society: July 1938.
Visvabharathi Quarterly: May-July, August-October 1938.
The Geographical Review: July 1938.
Journal of the Annamalai University: June 1938.
Foldrazi Kozlemenyek: (*Hungarian Geographical Review*): Vol. LXVI 1-3, 4-5. 1938.
Scottish Geographical Magazine: July 1938.
The Southern India Commerce: June 1938.
Indian Co-operative Review: April-June 1938.

made to feel their moral and financial responsibility to this cause, the men and the money will not be forthcoming. What are YOU prepared to do to help fill this need?

A. T. H.

The Husband Problem.

The temperance slides were being shown in a backward village. The picture of a Bhil farmer appeared. The speaker explained how this man and others in his house had taken to drink, his work was being neglected, his children were not being educated, and he was rapidly squandering his material possessions to satisfy his craving for drink. But later a change came in his life. He became a Christian and his reformation was complete. The next picture showed four girls of his house. As a result of the change in his life the children were sent to the Boarding school. The older of these four girls had finished the Standards and was in Training College. At this stage a man in the crowd began to think. What, Bhil girls being educated like that! They won't marry poor ignorant Bhils. So how will they get husbands? This thinking was done out loud, but, fortunately, the next picture was a group of Boarding boys who had dramatized the story as given in the first chapter of Daniel, and at once another man in the audience answered, "There are the boys they will marry!"

Monthly Temperance Meeting.

Subject: Centers of Influence at work.

1. Two Societies: Two temperance societies were organized with the hope that both would grow and develop into centers of influence for good, that both would win many from the follies of drink, that they would create a strong sentiment against the liquor traffic in their respective communities and thus become real factors in the fight for a sober India. However, one was never heard from, the leaders appointed were without vision, no meetings were held, no work was attempted, general indifference prevailed and the drink evil went on undisturbed. The other society was more fortunate. Officers with initiative, vision and determination were chosen, meetings were held, campaigns were undertaken, funds for literature etc. were secured, thousands of leaflets were distributed, hundreds of pledges were taken and that community was saved from the worst evils of the drink traffic. Petitions were sent to those in authority for the closing of certain shops, and also to their representative in the legislative council for the enactment of anti-liquor legislation. This was a working society and as a result its influence was felt far and wide.

2. Examples: Let two or more speakers tell of societies which have exerted or are exerting a strong influence for good. Look in temperance publications for reports of such societies. The story of the Rechabites as given in 35th chapter of Jeremiah is a notable example of one man's influence through the home upon future generations. The Men's Temperance Society at Pathankot as related by Miss Campbell is a striking example of what an enthusiastic group of workers can do for the temperance cause.

3. Centers at Work: Strong leaders are the life of any movement. As a rule such are found in towns and large centers. They should form a central association and through it reach the surrounding villages. From each district and taluka center associations should be formed, and these associations should branch out and reach every village within their respective areas. Stress should be laid on the necessity of giving so that in time each district association can support a man with magic lantern for part of the time at least, and also secure temperance literature for distribution.

Children Better off under Prohibition.

The annual report of the Massachusetts Society for the Prevention of Cruelty to Children, as given in the Scientific Temperance Journal, says:

"For many years our reports have deplored the destructive influence of intemperance upon family life. It still exists, but thanks to National Prohibition, to a far less degree. In 1916, a prosperous pre-war year, intemperance was second on our list and appeared in 47.7 per cent of our cases. In 1921, it had decreased to 16.8 per cent. In 1922 in has increased to 20.2 per cent.

"This increase may be due in part to lax enforcement of existing laws and in part to the fact that federal enforcement is with-

out the assistance of concurrent State law. Our experience dealing with the worst types of family problems involving child neglect, supports the testimony of other social agencies and observers of social conditions, that National Prohibition has proved a real blessing and has resulted in better home conditions and better care of women and children. . . .

National Prohibition helps in this case.

"For nine years, off and on, our agents have laboured with this family problem. In 1913, both parents were grossly intemperate. With four small children, they lived in a slovenly, poorly furnished apartment, scarcely fit for human habitation. Repeated interventions brought only temporary improvements. It was up and down. In January, 1919, the intemperance of the parents had brought the family down to two wretched rooms. The children were suffering for want of food and clothing. Conditions were intolerable, by court action, the children were removed and placed with a private child-caring agency.

"In July, 1919, came National Prohibition, and with it continued and lasting improvement in family conditions. The father began to work steadily; the mother to take a real interest in her home. Both were working for the return of their children. In September, 1919, conditions had so far improved that the Court on our Agent's recommendations allowed the children to return home under supervision. By March, 1922, the Agent was pleased to report to the Court that conditions were entirely satisfactory. The family had a good home in a decent neighbourhood. The rooms were well and comfortably furnished, in good order and immaculately clean. The children were clean, well clothed, well-fed, happy and contented."

Pure Stimulants.

Hot water, hot milk, hot coffee.

A small pinch of pure Cayenne pepper in a tablespoonful of hot water, may start the heart's action in collapse, or relieve violent pain.

Quarter of a teaspoonful of essence of peppermint taken in warm water, with sugar to taste.

Fifteen to twenty grains of compound cinnamon powder in a small cup of hot water.

Dr. J. H. Kellogg recommends the application of hot and cold water to the spine in rapid alternation to arouse the heart's action.

Beverages for the Sick.

Unfermented grape juice. Hot milk. Egg cream; beat the white and yolk separately, add milk and sugar, stir well. Egg lemonade: beat yolk and sugar well, add lemon and water, shake well, add the white beaten stiff. Barley water: boil pearl barley five or six hours and strain off the water; add milk or cream to taste.—*British White Ribbon*.

The Rev. R. J. Campbell has returned from America more than ever convinced of the good results of Prohibition, and also of the necessity for the friendliest possible relations between that country and ourselves. "I met some people," he said, "who think it possible that there might be some modification of the Prohibition law in the future; but there was one point on which everyone was agreed—that the saloon must never return. They said that the effect for good of the elimination of that factor from social life had been so marked that it was inconceivable that any community would ever vote for its return. I was told that there is a generation growing up that will never have known the taste of alcohol, and consequently will not desire it."

Impossible!

"Impossible," you say? Nay, nay, my friend!
That is a word for weaklings, not for men.
Ev'n now let prayer unto your God ascend
For overcoming faith, and grace—and then,
Lift up your eyes, lift up your heart, and go
In God's Almightiness to attempt the task.
Believing this: Yea, this thing surely know,
Your strength is measured by the things ye ask!
No thing's impossible that "ought to be!"
Though, if you say so, you'll be reckoned odd
By worldlings, who but worldly factors see,
And, oft as not, forgot to count in—God!

—*R. Ambrose Roberts.*

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World Prohibition Federation

PRELIMINARY ANNOUNCEMENT

International Conferences will be held in

ENGLAND AND DENMARK

during AUGUST, 1923, as follows:

International Order of Good Templars

SUPREME LODGE SESSIONS

London, August 9th to 17th, 1923

TOM HONEYMAN, I. Secretary, 160 Hill Street, Garnethill, Glasgow, Scotland.

International Congress Against Alcoholism

Meeting by invitation of the Danish Government

Copenhagen, August 20th to 26th, 1923

Dr. R. HERCOD, President, Avenue Ed. Dapples 5, Lausanne, Switzerland.

World Prohibition Federation

will hold an International Meeting in London
during the Good Templar Session, and its

Seventh World Prohibition Conference

during the Anti-Alcoholic Congress, **Copenhagen, August, 1923**

LARSEN LEDET, European Secretary, Aarhus, Denmark.

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